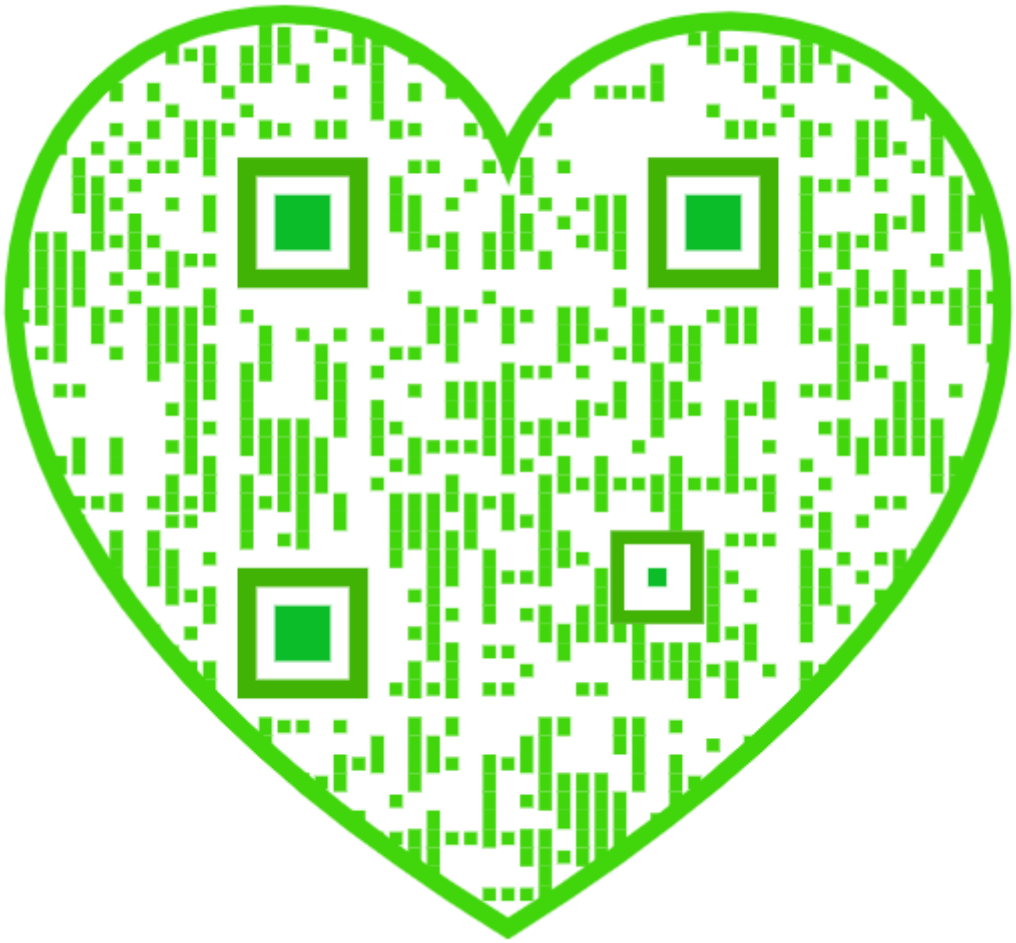

MURAL

OR

MONUMENTAL DECORATION:

Its Aims and Methods.

COMPRISING

FRESCO.	WATER-GLASS.
ENCAUSTIC.	MOSAIC.

OIL PAINTING.

WITH AN APPENDIX.

BY W. CAVE THOMAS,

AUTHOR OF "THE SCIENCE OF MODERATION," "METRONOMY, OR THE SCIENCE OF PROPORTION," ETC., ETC.

Ars probat artificem.

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PREFACE.

In order to save students the trouble and loss of time incidental to searching for and consulting scattered authorities, a body of trustworthy information will be found here collected, and arranged upon those processes which have been more or less used in Mural or Monumental Decoration, viz., Fresco, Encaustic, Water-glass, Mosaic, and Oil-Painting; information too, which it is hoped will prove not altogether uninteresting to the general reader. The author having studied Fresco-painting in Munich under the direction of Professors Cornelius and Hess, was enabled to furnish the Royal Commission on the Fine Arts with information on that special process, which was, together with other materials, carefully supervised by its Hon. Secretary the late Sir Charles Lock Eastlake, and printed and published in the Commissioners' Reports. It may be recollected that the Royal Commission on the Fine Arts was instituted for the special purpose of promoting and encouraging a more extended practice of mural painting in this country.

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By the moderns Encaustic painting has been less practised than Fresco; it is therefore in a more uncertain experimental condition, no one method being yet recognised and generally adopted. Various opinions and descriptions of experimental processes are consequently brought together, that the study of them may lead to some settled practice.

In explanation of the new method of Water-glass adopted by Director Von Kaulbach in the execution of the noble works in the Museum at Berlin, and more recently by our great painters Herbert and Maclise, in their pictures in the new palace at Westminster, the writer has been graciously permitted to reprint the pamphlet translated from the German of Professor Fuchs, which was issued and privately circulated by command of his Royal Highness the late Prince Consort.

As the final process in Mosaic is the province of the artist-workman rather than the artist, the subject is treated more in reference to its decorative capabilities than technicalities. In the chapter on Oil-painting, the writer has attempted to give the theory of the use of colours, a theory not specially confined to oil, but in some measure to all methods of painting. For the contents of this chapter he is entirely responsible.

In the Appendix will be found a copious List of English and Foreign Works upon Art, published at various dates; Lists of Painters chronologically arranged, their ages and styles; and of the princi-

pal mural works now existing, where, by whom painted, and by what process.

A second volume, containing Treatises upon Anatomy, Perspective, Proportion, &c., would complete the writer's original project, which was to bring all the useful subjects in connection with the practice of Painting, conveniently together for immediate reference, and in order to promote a more widely spread and accurate knowledge of them.

One advantage in carrying out the original scheme would be, that the information thus brought together, might from time to time be revised and gradually perfected.

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ON

MURAL DECORATION.

INTRODUCTION.

The Aim of Mural or Monumental Painting.

Architectural magnificence has invariably been the exponent, as well as one of the most enduring monuments, of a nation's tendencies—the invariable exponent, because national art is inevitably stamped by the ruling influence, be it religion, commerce, or arms, which sways the whole thoughts and activity of a people.

Egyptian art, in its ponderous temples, tombs, and pyramids—constructed of the most enduring materials—its lavish hieroglyphics painted and incised, no less than the custom of embalming dusky generations, exhibits that love of perpetuation which consistently belonged to a nation teaching the doctrine of the Immortality of the Soul. There is about Egyptian relatively to Greek, and Roman monumental art too, a basic character correspond-

ing with that which Egyptian teaching bore to the philosophies and civilizations which sprang out of it.

The simplicity, harmony, and balanced proportion of Grecian monumental art indicate the nation's aspirations after the perfect idea, its belief in the Phidian power of education gradually to mould a people intellectually and physically to an ideal standard, and to form the rough plastic humanity into men-heroes. The whole product of Grecian thought bears the stamp of high culture upon it, in its moderation, its completeness; and the intellectual precedence of antiquity is given to the nation which enthroned the Parthenon on a rock, which made its Temple to Wisdom a beacon seaward, and to the ages a very palace of art, compelling us to confess that the ancients, in this respect at least, attained to an excellence which we, with all our boasted *progress*, seem only doomed to beat about and fall short of.

How different the Roman to the Grecian monuments! for although the Romans frequently enlisted Grecian artists in their service, they either imperiously compelled or corrupted their taste, which, forced from its native purity, became ostentatious and florid in its adopted expression. There still remain triumphal arches, temples, arenas, camps, military roads, theatres, baths, and mural decorations on which lust of conquest, is indelibly branded. Rome, imperious in her strength,

imperious in her fall, ruling by arms instead of moral force—was living, hated for her iron hand—is dead, a wonder to the antiquary. Her example has been a false light to the nations who have steered by it. Her very faults, even those of taste, cropped up, upas-like, to mar in after-ages a new art-development; but the taste of the cinque-cento had Christianity and the power of several colossal intellects to preserve the grandeur and simplicity of Christian art from that entire perversion which threatened it, from the pseudo-classical fashion which took possession of the time. The ancient Roman taint, however, which showed itself slightly in the painting, more in the architecture, and most in the sculpture of that period, re-asserted itself to the full in the later Renaissance of the Netherlands, springing from the same fashion, but which, losing a more intellectual control, a greater national sensibility, and precipitated by the wonderfully facile genius of the Dutch painters, fell into the coarsest redundance in its application and forms.

The architecture of the Middle Ages, which is commonly spoken of as the Gothic period, unmistakably reveals the dominant influence of the Church, not only by the great purposes to which its principal creations were consecrate, but by a certain conformity in its proportions, disposition, and embellishments, to the mysteries of the faith. In the magnificent monuments of this epoch one

cannot fail to observe that the best art-intellect of the period was endeavouring to surround Christian worship with the beauty of mystery. In one direction struggling with imperfect resources, among rude uncultivated peoples scarcely emerged from Paganism, the Gothic was marred by grotesqueness of detail: in another direction—as in Italy—it found a keener artistic sense plastic to its use, adopted a chaster style of ornament, made room for higher forms of painting and sculpture, and gradually rose towards a finished simplicity and purity, till stopped by the classical revival.

In all these periods of architectural magnificence, mural painting and sculpture have, in a greater or less degree, played a conspicuous part in monumental art; and we may learn from the remains of the past, the two most important reasons for encouraging the highest forms of art: (1) as a memorial of national existence; and (2) as the record of the aspirations of that existence. It should be recollected that monumental art, in its highest development, exercises a dominant influence over the arts of design of a country, binds them together, gives them a certain unity of action in conformity of motive, which spasmodic art, originating in individual and disconnected culture, never can. It is not in the prejudiced spirit which would banish all forms of art but the highest, that these remarks are penned; but in the conviction that the encourage-

ment and cultivation of the highest favourably influences the subordinate forms of art, and raises them to a greater perfection than they would otherwise attain. Thus, we find some of the most valued and characteristic specimens of ornamental art did not emanate from designers educated for the *special* purpose, but were the products of minds stooping from loftiest work to imbue common objects with grace and beauty. The object of a National School of Art, therefore, should, like a National College, not be to educate for specialities or technicalities, but up to the most general or the loftiest idea. Education and Art must necessarily have a common ideal, and that which the latter seeks either to depict or model, the former strives to make a living fact. The constitution of the *perfect humanity*, intellectually and physically, should be the great study of both.

The pertinacity with which poets and painters resent the notion of poetry and art being amenable to rules or science is very remarkable, if we consider that they urge "inspiration" as their claim to exemption, for *order* is Heaven's first law, and science the knowledge of that Divine order in nature; the working according to correct principles, therefore, whether it be done consciously or unconsciously, can be the only real criterion of the "heaven-born."

There is a science, that of Proportion, under-

lying all things, which the artist ought to investigate for himself, for it will enable him to discover a common principle of rectitude in nature, capable of simple enunciation, viz., Moderation.[1] The antiquity of the insistance on the observance of the "golden mean," and the testimony of the ages to its correctness and wisdom, are in themselves no unimportant evidences that quantity is the fundamental form of phenomena. The universal application of the "Theory of Proportion, or of Definite Quantitative Relation," requires that many minds be yet directed to the subject before it can hold that important place and consideration in the curriculum of education to which it is destined, the general tendency of thought being to seek for truth in some complex and recondite enunciation, rather than in the simple word, moderation, lying at our very feet.

In comparing the treatment of a cabinet picture with that of a work of the largest size—for example, where the figures are colossal—it may be observed that the small picture, besides being executed with delicacy, generally exhibits a certain fulness of detail, while the large work is not only less elaborate, but is composed of fewer parts. Even assuming the same subject, and one requiring a variety of minute accessories, to be represented upon a colossal and on a small scale, it may be

[1] "The Science of Moderation; or, Quantitative Theory of the Good and the Beautiful."—Smith, Elder, & Co.

safely affirmed that the degree of detail which would be admissible in the small picture would be objectionable in the larger. In a grander and more ideal subject, where such detail would be inadmissible under any circumstances, the comparison could be less fairly made, but a similar influence would be more or less apparent. Thus, assuming these conditions to be common, the greater space never allows the introduction of *more* detail than the smaller, but generally, if not always, requires *less*.

Without entering into the examination of this question as connected with the laws of vision, it may be remarked that, although the indistinctness arising from distance may be counteracted, as regards the most important qualities in art, by increased dimensions and by appropriate style and treatment, it must still tend to exclude certain refinements of imitation which are appreciable in pictures requiring to be seen near—refinements capable of conferring an interest on details that may be unimportant in themselves. The inference is at once applicable to the question proposed. The familiar subject, being fullest of accidental circumstance, must be best displayed in dimensions fitter for near inspection ; and with respect to an advanced state of art as regards imitation, excellence must be a consequence of the habitual adoption of such dimensions ; on the other hand, the larger the figures in a picture the greater the

distance at which the work must be seen; and as the omission of detail is a consequence of that reduced scale of gradation which distance supposes —as the absence of minute particulars is felt to be the attribute of distance without reference to the size of objects—so the accessories in the larger work of art require to be few and important. Thus again, increased dimensions, by involving the suppression of detail, suggest subjects of corresponding dignity.

Such appears to be the relation of dimensions to style and subject, considered with reference to technical results; as regards the question of taste, it may be observed that the involuntary conclusions derived from the influence of association agree with the practice of art. The analogy between grandeur and the absence of detail, and between minute circumstance and familiar incidents, is sufficiently apparent. With these analogies the impressions produced by magnitude and its attributes, and by the opposite qualites, respectively correspond.

The general relation thus defined has often been reversed in works of art, but not with equally good results, for it may be remarked that large works, when elaborate in detail and full of accidental circumstance, have the unpleasing effect of magnified cabinet pictures; on the other hand, diminutive historical works, when treated with the breadth belonging to the grandest style, must give the im-

pression of large works diminished. The last-mentioned inconsistency can hardly be an objection; grandeur of conception and treatment must unquestionably be acceptable in any form, but nevertheless, the abstract breadth of imitation which is indispensable in elevated subjects is, under the circumstances, supposed a kind of contradiction, inasmuch as the vague generalization of a distant or ideal effect is submitted to close inspection, and can only be so viewed. The small pictures by Raffael and Corregio are of this description; but the instances of such subjects being treated on so minute a scale are not frequent.

It is unnecessary to enumerate other exceptions, or to refer to larger works in which a just adaptation of style may have tended to obviate an incongruity between subject and dimensions. It may be sufficient to have dwelt on those plainer principles which result from the technical and external conditions that have been considered, but which may afford a criterion with regard to some of the more arbitrary conventions of works of art.

It may be added that even extreme conclusions which might be deduced from the conditions referred to, are strictly conformable to the authority of the grandest examples of art. The loftier aim of imitation, thus defined, may seldom be literally compatible with the usual range of subjects; but

in this instance again, the criterion, as such, may be admissible. Thus, assuming the representation to be dilated to its full measure, details of costume, illusion, and even the more delicate varieties of colour, are no longer fitted for the dimensions. But in proportion as the subordinate excellences of imitation are excluded by the nature of the existing technical conditions, the display of the nobler qualities still obtainable becomes more necessary. As the resources of art become circumscribed, the artist's aim becomes elevated. In the highest style of painting, as in sculpture, the representation of inanimate substances ceases to be satisfactory when they no longer directly assist impressions of beauty or grandeur ; and the styles of art in which the living form can be least dispensed with, are precisely those which, by the abstract characters of their imitation, render it least objectionable.

The foregoing considerations may warrant the conclusion that the grandest style of art is best displayed in large dimensions. It will also follow that the treatment of subjects fitted for such dimensions must tend to ennoble the style and taste of the artist.

As, therefore, works of such magnitude cannot be often in demand for ordinary dwelling-houses, it is important that mural painting should be encouraged in churches and national municipal public buildings. On ordinary occasions the imi-

tative arts may be considered as adventitious embellishments: but in proposing to adorn an important national edifice, where it is essential that a characteristic unity of design should be maintained throughout, painting should appear as the auxiliary of architecture. It was thus that it was employed in the best ages of Greece and Italy, and it was thus that its highest development was insured.

The numerous public edifices which have of late been completed in France and Germany, have in almost every case been embellished with the productions of painting and sculpture. This application of the imitative arts has prompted inquiries into the principles which may regulate the adaptation of those arts (especially of historical painting) to architecture; not without reference to the examples of success and failure which the decorated buildings of former ages present. The same question which is now proposed for solution, has been considered and practically answered with various results in Munich and Paris. The experiments that have been made in those cities by artists of eminence, and the opinions that have been expressed thereupon by competent judges, form, therefore, an important addition to the evidence of older works of art, and may assist in the examination of the subject.

The union of painting with architecture supposes a principle of adaptation or selection in the style of one or both. The architect, in arranging

his spaces, might find it advisable to adapt their size to the distance to which the spectator could conveniently retire to contemplate the paintings; or might be induced to vary the form of such spaces, with a view to certain subjects. The principle of adaptation is most indispensable for the painter; for if, in such a combination, the productions of painting should appear as adventitious ornaments, varying according to the taste or caprice of each artist employed, the result might be a mere gallery of pictures. This mistake, to a certain extent, seems to have been committed in the Church of the Madeleine in Paris. The defect is said to be the more striking as the subjects of several of the paintings relate to the life of the Saint, who, according to the conception of each painter, is represented very differently. In such an assemblage of pictures, whatever might be the degrees of merit, the spectator would look in vain for any evidence of a similarity of aim. An essay in the "Revue Générale de l'Architecture" may be quoted. The remarks of the writer are suggested by the celebrated work of M. Paul de la Roche, painted in oil on a semicircular stone wall in the School of Fine Arts at Paris.

"When first the architect opened to the painter the doors of a recently finished edifice, and showed him the walls which were to be adorned by his skill, an elevated art arose, the essential princi-

ples of which were at once defined by the conditions of this union. This art may be called Mural, or Monumental Painting. Its characteristics are so pronounced and so distinct from easel-painting, that perhaps the relation between the two might be aptly expressed by the circumstances attending their respective modes of execution, by comparing the durable walls of a temple with the fragile stretching-frame under which the easel trembles."

Painting being employed to decorate large and solid surfaces, the artist is no longer intent on the reproduction, however ingenious, of reality in its most limited sense. A dignified subject is essential; and to this, genius is required to add ideality or elevation of treatment. Lastly, simplicity, the indispensable characteristic of great works, must be apparent in the composition and the execution. Hence arises the especial condition of excluding from mural painting all that may interfere with grandeur and effect—all that aims at literal imitation and illusion. It is to be remembered that the painter is, in this case, not alone; his art is employed together with the work of the architect, in decorating the same interior. There can be no difference of purpose between these two exponents of one and the same thought; and if one art is dependent on the other, it is that of the painter. It is further to be remembered that the walls must always be felt to exist under the decorations

that cover them, and the skilful and magical effects by which the painter gets rid of the surface would here be out of place.

Thus, under whatever point of view this question is considered, monumental painting must still be limited to an elevated region, where all is grand, simple, and unaffected. It is thus that its style was defined by the great masters who, from Giotto to Michael Angelo, covered the walls of the palaces and temples of Italy with their works. They painted in fresco; and Michael Angelo, foreseeing the decline of the grandest style, and the superior energy and self-denial required of its votaries, had reason to call easel-painting an occupation for women. From this period (the middle of the sixteenth century), the tradition of elevated art was unstable. Succeeding painters, down to Pietro da Cortona, poured over vast surfaces their crowded compositions, in which the qualities of fresco became useless. To complete the decline of monumental art, it remained only to neglect the process itself. Accordingly, from the beginning of the seventeenth century, oil-painting was introduced, commonly on walls, particularly in France; and the artists looking on this mode of painting as an opportunity for displaying the effects of foreshortening, perspective, and colour, produced what the Italians called vast "machine," differing only from the decorations of the theatre by better studied forms and a more

finished execution. We have no right to consider modern artists responsible for this practice : it is to be dated from those painters who first lost sight of the conditions which regulate the style of painting when that art is applied to architecture. It is from the point of view which has just been indicated, viz., the union of painting with architecture, that the genius and labours of the band of German painters who revived mural painting in Munich ought to be estimated. They were great artists in the best sense of those words, for they identified their art-revival with a newly awakened yearning aspiration towards a more important, extended, and united national existence ; and thus, being far-sighted patriots, contributed more than even their countrymen are aware to its recent realization. There may be a clever, but never a grand manifestation of art, till a people be moved by one pulse, one simultaneous throb ; till all talent is concentric to a common purpose. The art developed under such circumstances may lack some of the syren qualities of a purposeless people displaying its intellectual eccentricities, but it will make a greater mark in the future. Do Englishmen ever ask themselves, whither bound—to what end—are art, literature, and politics tending ? Has England any part to play in the World's history, and what ? If we cannot answer these questions satisfactorily, may it not be said that we are merely beating the wind,

which, like all aimless trifling, will bring us into mischief or contempt? It is unity of purpose alone, in art, literature, and politics, which constitutes greatness, and which gradually raises a characteristic and enduring national monument.

FRESCO.

The art of Fresco-Painting, or of painting upon fresh mortar with colours simply mixed with water, is of great antiquity, and has been alternately practised or neglected as magnificence in architecture has prevailed or declined. And as we have shown that architectural display is indicative of a concentric national development, it may be concluded that the practice of Fresco-Painting points to the same fact.

In this country, people, generally speaking, have very confused notions about fresco. I have heard the paintings on the ceilings of Greenwich Hospital, and in the dome of St. Paul's, in short, all kinds of mural pictures, thus denominated. This is, of course, in ignorance of what properly constitutes and distinguishes fresco from other methods of painting. No work, unless executed in the manner we are about to describe, can be correctly styled fresco. And it should be distinctly noted that when fresco is roughly stated to be the method of painting upon fresh-floated mortar with water-colour, that this is neither with the "cake" nor "moist" colours in common

use, but with the raw pigments either mixed with pure water, or hydrate of lime.

Some years ago Europe, at least art-Europe, was aroused to an interest in fresco by the fame of the works executed in this method by Cornelius, Schnorr, Hess, Kaulbach, and other eminent painters at Munich; and the revived interest in the process was further heightened in England by the decision of the Royal Commission of Fine Arts, that fresco should be adopted for the mural decorations of the new palace at Westminster.

It may reasonably be inquired why the more familiar process of oil-painting on canvas should be abandoned for colours mixed with water, and a fresh mortar ground, in the execution of pictures for public edifices. This question shall be answered, and the reasons given for the preference and substitution of fresco, before describing the process itself—reasons which have been sufficiently cogent to withdraw the great painters from the convenient easel and the quiet studio, and compel them to mount rough scaffolding into the mid-air of unfinished buildings; in fact, to deny themselves the comparative luxury of oil-painting, and to become plasterers as well as painters. For although fresco-painters may be seldom called upon to spread the mortar ground, they ought to be able to do it dexterously.

The rich and varied effects which characterize

oil-painting are ill applicable to a severe style of architecture. The brightness of tints, powerful relief, the finish of details, are resources easily abused, especially when the artist has long been accustomed to them. Such means require, on the contrary, to be subdued and simplified, so as not to transgress the limits of a well-understood style of decoration. To these objections it may be added that oil-painting applied to walls has no principle of durability or solidity, especially when employed on large surfaces. The experienced chemist, M. Darcet, who has made science available for so many practical objects, thought he had remedied this defect by preparing walls with new grounds for painting, but the paintings of Gros, in the dome of the Pantheon, at Paris, prepared under his direction, have already suffered in some places.

It may, perhaps, be admitted that fresco is not better fitted to resist the action of a humid climate; yet the frescoes of Mignard, in the Church of Val de Grace, are well preserved, although the re-touches in coloured crayons, added by the artist after the work was completed, have faded. After all, the question of durability need not be considered so all-important; for even if we could succeed in rendering oil-paintings on walls durable, it would be impossible to give them those qualities fitted for architectonic decoration which specially belong to fresco, and which caused that

method to be preferred by all the great masters of the Italian schools.

But although fresco admits of the design being studied to any extent in cartoons, yet in its ultimate execution it is not an art for the hesitating and timid. It requires a grand style of drawing, a broad and simple treatment of colour, an eye steadily fixed on the whole effect, and an energetic and rapid hand ; all qualities which, it must be confessed, are rare in these days.

The Italian masters were always fully impressed with the necessity of adapting their works to the effect of their architecture, so as to make one harmonious whole. The nature of fresco fits it for such a purpose. It is, indeed, impossible to produce that illusion which is considered so desirable in oil-pictures. The same depth of shade is not in the artist's power, but this very circumstance, while it compels attention to composition, colour, and form, indicates the appropriate limits of effect, and renders fresco more directly appropriate for strictly decorative purposes.

The absurdity of painting in oil upon walls into the composition of which lime has entered, is so evident that it can scarcely be attempted again. The lime and its salts are certain to cause the rapid decomposition of such works, which usually end in becoming perfectly black. The inclination of oil-colour on plaster is always towards the dark and heavy, whereas fresco has the reverse ten-

dency—or to become lighter, and although this is also a defect, it must be admitted that it is the lesser evil of the two. Of English palaces painted in oil, Hampton Court is one well known, and heavy as its decorations now appear, this heaviness must continue to increase. The British Museum, or old Montague House, was another instance of the darkening tendency of oil-colour on plaster, and those who may remember it, must recollect the dismal appearance of its walls : where once, probably, brilliant colour existed, nothing but darkened masses were latterly apparent—a decorative experience which it is hoped will be remembered for the future.

The tendency of large surfaces of canvas to bulge, and thus to impair both the apparent solidity of the architecture, and the effect of the painting is a sufficiently obvious reason for its abandonment.

It being the nature of mortar to set after it has been rendered a few hours, in consequence of its absorption of carbonic acid from the atmosphere, in which condition it must be painted upon, it must be assumed that it is impossible to re-touch a fresco-painting to any extent. The portion of the work undertaken in the morning must be completed during the day. Hence every part of the design must be defined preparatory to painting. This necessitates the execution of a finished drawing of the design to be painted : sometimes this is

done to the full size of the intended work, sometimes very much smaller. These preparatory drawings are called cartoons.

In the cartoon the artist determines his composition, studies every portion of it from models, draperies, &c., in fact, makes a work complete in every respect but that of colour, an exact working drawing.

These drawings, if large, are executed in charcoal, on paper which has been pasted to stretched calico or canvas, and afterwards sized. Charcoal is used in preference to chalk on account of the facility with which it may be dusted from the cartoon if any alteration in the design be required, and the limited half-tint it affords for the masses of shadow. A steaming apparatus is used to set the finished drawing; this is passed slowly over every part of the artist's work, and as the jet of steam impinges on the sized paper, it softens the size, which now receives the particles of charcoal, and when dry, prevents them from being dusted off or easily erased. To render this operation more certainly and speedily effective, the back of the cartoon is sponged over; this causes the steam to be condensed more rapidly on the other side, but requires increased care on the part of the operator, otherwise moisture accumulates too rapidly, and running down, carrying the charcoal with it, spoils the cartoon.

It was the practice of most of the great mas-

ters to make cartoons the full size: the German painters, for the most part, follow this practice. Hess is, however, an exception: his cartoons are very small and most beautifully executed in pencil, these are afterwards reticulated and enlarged in outline by his pupils, to the full size, on thin paper, which, when the outline is completed, is finally converted into tracing-paper by oiling.

Besides the cartoon, in which the forms and general light and shadow are determined, it is desirable to have a coloured sketch of the whole composition, for after the fresco is done, it is almost as impossible to change colours as forms. The artist having finished his cartoon and sketch of colour, is prepared to commence the fresco, and to proceed with certainty.

It has been already observed that the fresco is a final operation; any considerable alterations that may suggest themselves when the cartoon is completed, must be made on the cartoon, or rather upon additional pieces of paper fitted upon it.

One of the most interesting examples of the nature and the extent of the alterations that may be introduced in a composition prepared for fresco, is the cartoon of Raffael's School of Athens. The figure of Epictetus represented in the fresco sitting in the foreground on the left, leaning his head on his hand, is wanting in the cartoon. This figure was added to fill up a vacant space, and thus the change (a considerable improve-

ment) involved no inconvenience. Some less important alterations in the same fresco, such as covering the head of Aspasia with drapery, instead of showing her flowing tresses (for thus she appears in the cartoon), might have been made on the wall, without any change in the drawing. That this cartoon was the identical one which served for the execution of the fresco, is proved by the exact conformity of every part, except the additions above mentioned, with the painting.

Palomino, in his work on fresco-painting, referring to the methods taken by more modern practitioners of the art of fresco-painting to evade the study and care which it demands, observes, in speaking of the cartoons of Michael Angelo and Raffael, that artists had become impatient of so much toil, having found that their enthusiasm evaporated before the period arrived for the execution of their work.

The Preparation of the Wall.

Walls intended to receive frescoes should be built of bricks, well dried, and of equal hardness; the surface of the bricks should be chipped, the better to hold the rough coat of mortar. All the frescoes in Munich are painted on the plastered brick walls; laths with wattling and copper nails are not approved of, as the risk of bulging is thus increased. The use of laths is sometimes necessary for certain surfaces, but a brick ground

is to be preferred wherever it is practicable, not only on account of its solidity, but also because it is better adapted for the execution of the painting.

The brick ground absorbs superfluous water, and keeps the plaster longer in a fit state for painting upon. The painting-ground dries much quicker on laths, as two surfaces are exposed to evaporation. The walls ought to be thoroughly dry. A wall of a brick, or a brick and a half in thickness, is preferable to paint on. Professor Hess once observed to me, that where the walls in the lower portions of the great public edifices were five or six feet thick, the liability of saline matter making its appearance was much increased, as the mass of brickwork remains longer in a humid state. In Italy, the practice of lathing walls is unknown, but many of the finest Italian ceiling-frescoes are on lath, and are in perfect condition. Most vaulted ceilings, in what is termed the *piano nobile*, or principal floor of every palace, are constructed of wood. The lathing in this case is not attached to single thin pieces of timber, cut to the shape of the ceiling, but to a strong grating; in some cases the ribs and transverse pieces of this grating are four inches thick each way. The lathing in Italy is a very peculiar process. The material is the reed, which is cultivated so extensively in that country, and used in so many ways. It grows to the length of about eighteen feet, and is rather

more than one inch and a quarter in diameter at the base. When these reeds are used for lathing, they are split, and not being strong enough for the purpose in this state they are wattled upon the grating. The result of this somewhat complicated contrivance is a framework of great strength.

In the preparation of walls and ceilings for fresco-painting, no expense should be spared; battens and laths are obviously perishable materials, and therefore ought to be avoided. The damp from exterior stone walls may be guarded against by lining them with brick, and now that the use of cast-iron is so well understood, the girders or joisting of houses where fresco-painting is contemplated, should be of iron arched with brick between, and thus a perfectly level ceiling may be formed of the most durable kind. For the more effectual prevention of damp, it has been recommended that a false wall should be built, leaving a small space between it and the stone wall, to which it could be bound at intervals. This plan might also be adopted where the brickwork of the main walls is very thick. To guard against damp from roofs, or even occasional washings of upper floors, it has also been suggested that a coating of asphalte might be applied on the upper sides of the arches of ceilings. In some cases, asphalte might be necessary in walls. A French architect, M. Polonceau, effectually checked the progress of damp from a humid soil in several

instances, by covering the horizontal surface of the masonry a few inches above the level of the soil with a coating of liquid asphalte, applied with a brush; this, when dry, was covered with a layer of coarse dry sand, and the building then proceeded with. In considering the question respecting the comparative fitness of laths and bricks as a ground-work for fresco, it is not to be forgotten that the battened wall sooner adapts itself to the temperature of the atmosphere, and is therefore less likely to be affected by external damp; while the coldness of the more solid wall causes in humid weather the rapid condensation of moisture. This evil might perhaps be guarded against by due precautions with regard to temperature and ventilation.

If the wall to be painted is covered with old mortar, the ingredients of which are unknown, this coat should be entirely removed till the solid materials are laid bare, then the rough coat, composed of river-sand and lime, should be applied. The proportions of the sand to the lime may vary in different climates, and the working builder and mason are sufficiently experienced on this point. In Italy it appears that two parts of sand were added to one of lime. The thickness of the coat is such as is generally used in preparing the walls of dwelling-houses. The surface of this first application should be rough, but not unequally so; and the mason should avoid leaving cavities in it

—a moderate admixture of small flint pebbles in the rough cast is the practice in Munich. If the rough cast be uneven in its surface, and the remedy be sought in the after-coats, the intonaco will crack where it is thickest, and if the inequalities of the rough cast be followed in spreading the intonaco, dust will settle in patches on the finished painting. It has been proposed that the entire surface of a wall to be painted should be inclined (slightly) forward to prevent the lodgment of dust, which takes place to some extent when the surface is even, but perpendicular.

The wall thus prepared, should be suffered to harden perfectly: the longer it remains in this state the safer it will be, especially if the lime used was in the first instance fresh. In that case two or three years even should elapse before any subsequent operations are undertaken. Among the essential conditions of fresco-painting must be mentioned the preparation and seasoning of the lime, which will now be described.

The selection of the lime intended as a ground for fresco-painting is a matter of great importance. The qualities of the lime of this country have been questioned as to their fitness for fresco-painting, but it is satisfactorily shown that a material is obtained even superior to any other yet known to have been used in the preparation of grounds.

It is not here intended to observe at any length on the qualities of foreign limes, but only to

mention them comparatively, and in such a manner as at once to show that it is not necessary for the painter to seek at a distance from home a material for grounds which afford the experimental maximum and minimum qualities whence to deduce an average for himself.

A limestone consisting of as few foreign ingredients as possible is generally esteemed the fittest, although Carrara marble, which is a pure carbonate of lime, is liable when heated, from its granular and crystalline structure, to fall into a coarse powder, and thus the inconveniences attending the burning and slaking render it unfit for use, while even a much less pure lime has been employed without any bad results.

The limestone used by all the great artists who painted in Rome in the beginning of the sixteenth century was Travertine, of which St. Peter's, the Colosseum, and other ancient and modern edifices in Rome are constructed. It is recommended by Vasari, and was probably used for this purpose by the ancients.

It is almost a pure carbonate of lime, affording in a hundred parts—

Carbonate of lime	99·4
Alumina, with a trace of oxide of iron	·6
	100·0

During the best period of Italian art, the lime of Genoa was highly esteemed, and remarkable for

its whiteness. Frescoes on the exterior of that city have resisted the effects of sea-air. In analysis this lime yields—

Carbonate of lime	63
Carbonate of magnesia	36
Earthy matter, oxide of iron, and bituminous matter	1
	100

The lime used by the Florentine painters is found to be almost pure carbonate of lime, and of that used at Munich the proportions are—

Carbonate of lime	80
Ditto of magnesia	20
	100

Although the purest lime has always been sought and recommended, it is yet shown that impurity to a certain amount is not injurious to the work. A fresco was executed about five-and-forty years ago at Bath, by Mr. Thomas Barker, which I believe still remains in good condition; the lime was procured from the Wick stone. The analysis is—

Carbonate of lime	97
Impurity, chiefly oxide of iron	3
	100

And that used by Mr. David Scott for a fresco at Edinburgh some years since, affords—

Carbonate of lime	94·5
Silica, alumina, a little oxide of iron and bituminous matter	5·5
	100·0

We have yet, however, limestone preferable to these, and even equal to the Roman materials; this is the limestone procurable on Durdham Down, near Bristol: it is composed of—

Carbonate of lime	99·5
Bituminous matter	0·3
Earthy matter	0·2
	100·0

To reduce the causticity of the lime is a main object in its preparation; this depends, in a great degree, upon the length of time elapsing from the period of its being slaked to that of its use. It is well known that lime, for a certain time after being slaked, is unfit for use. The effect of its being employed too soon is, that it blisters—a fact mentioned by Italian writers on art. Some pictures executed in this country without this precaution had the effect of a snow-storm, the blisters flaking off and leaving innumerable white spots.

With respect to the length of time necessary to subdue its causticity, authorities vary. Italian writers do not insist upon its being kept a very long period. It is known that lime is available after having been kept some years; it is also known that it may be employed after periods of much shorter duration. Hence exists, upon this subject, a variety of opinion. By some authorities, both in Italy and Germany, it is not considered

necessary to keep it longer than a few months; by others, three years at least is insisted on before it is used for the pigment or intonaco. Cornelius had the lime prepared for the frescoes of the Ludwig Kirche eight years before he painted them.[1] A desirable and valuable end, however, would be to know in how short a time it may be employed with entire safety.

The non-caustic state of lime is arrived at when, by exposure to air, or by some other means, it has regained its maximum of carbonic acid; but if buried and kept from such sources, it cannot, in any considerable degree, acquire that which renders it non-caustic. Time has no effect on pure lime, whether slaked or unslaked, provided it be not exposed to atmospheric air, or some other source of carbonic acid.

It appears, however, that some degree of causticity is indispensable to give adhesive firmness, and to render it fit for the purposes of the fresco painter, because, to this certain degree of causticity it is indebted for the quality of induration which is exerted on exposure to air when in a moist state.

As regards incidental ingredients, the presence of magnesia does not diminish the whiteness of the lime; and in other respects it has not been found objectionable. Other matter found in association with carbonate of lime might diminish its

[1] *Vide* memorandum at end of this chapter.

causticity, but might be otherwise objectionable; thus, iron would operate on the colours; silver and alumina would probably cause the lime to set too fast.

All artists and writers are agreed that lime when too new is unfit for use; long keeping has been supposed to give value to it as increasing its quality of consistence, besides reducing its causticity. An Italian writer (Leon Battista Alberti) asserts having seen some ancient lime which, there was reason to suppose, had lain neglected for more than five hundred years, and which far surpassed honey or marrow in consistence.

With respect to burying lime for a long period, insisted on by most fresco authorities, it has been chemically shown that, instead of rendering it mild, this preserves it in a caustic state. There is no danger of it becoming dry even if buried in the mere earth, but some recommend that the pits intended to hold the lime should be lined with brick, in order to preserve it from impurities. Thus preserved in a state of "putty," it is the opinion of our first chemists that no chemical change whatever can take place, but that an improved consistence in the paste, by a mechanical alteration in the arrangement of its particles, may be the result, advantageous to the fresco-painter.

It is common to talk of more or less caustic limes, as if mere lime could vary in its quality: it

is the same in all limestones, and is only greater or less in quantity. The purest limestone consists, in atomic proportions, solely of—

Carbonic acid	44
Lime	56
	100

Thus constituted, whether in its original state or reproduced by chemical agency, it is not at all caustic. If the limestone be subjected to sufficient heat, it loses the carbonic acid, and there is left—

Lime	56

Let there be added to this lime as much water as will combine with it, and the result is a compound of—

Lime	56
Water	18
Hydrate of Lime	74

It is to be observed that this proportion of water in combination with the lime does not apparently moisten it. Hydrate of lime is a dry powder; the addition of more water either mixes with the lime mechanically, or dissolves it.

Let these seventy-four parts hydrate of lime be exposed to the air, the water is expelled by carbonic acid, and the result is, as at first—

Carbonic acid	44
Lime	56
	100

This is, chemically speaking, the original limestone, although the original state of cohesion is never regained.

Preparation of the Lime for Painting and the Mortar.

The burnt limestone is slaked, and mixed in a grouting-box. The instrument used in mixing it is similar to that used by our masons. The lime is worked with this, and water is thrown in till the substance is of the consistence of cream. At the end of the box is a sluice, the opening of which, however, comes only to within an inch and a half of the bottom of the box. On being drawn up the sluice allows the lime to escape; but small stones or impurities, which may have sunk, are prevented from passing by the ledge under the opening. The lime is received into a pit, dug in the earth, to the depth of several feet and of any convenient size. The process of mixing in the grouting-box is repeated till the pit is well filled, the box being washed out with clean water every third or fourth mixing. The lime being thus prepared, is left in the pit from eight to twelve months, according to its ascertained strength. The lime for the first rough coat need not be kept more than two months; this is allowed to dry perfectly before the next coats are applied. No hair is used in the mortar.

The lime of which the "intonaco," or coat of

fine mortar, is composed, is, however, to be subjected to a much more careful preparation than that used for the rough cast. After it has been kept for the requisite time, it is taken from the pit as it may be wanted, great care being taken not to take up any clay or earth with the lime. It is now thrown into troughs, and again thoroughly mixed with water, till it is not thicker than milk; it is then allowed to escape through an open sluice, and to pass through a fine hair-sieve into earthenware jars; a number of these jars is required, and each is filled to within a third of the top. The lime is allowed to settle, and when the water which rises over its surface is clear, it is poured off. This is repeated till there is no more water to pour off; and the lime remains in the jars of the consistence of the white paint commonly used, and is quite as smooth. It is now ready to be mixed for the intonaco, which consists as usual of two parts sand and one of lime. Great pains are taken in Italy to find a suitable sand: it must be perfectly clean and sharp; its colour favourable, and the grains of equal size; as the intonaco should not be too dark. The presence of any earthy particles in the plaster would inevitably ruin the fresco. This accounts for the very careful preparation which all the materials used undergo. No plaster of Paris should be mixed in the mortar of the rough cast: in the finer coats it is never employed as a pre-

paration for fresco. In Munich small flint-pebbles are moderately used in the ground-coat. The rough cast should not be too compactly laid on, as its porousness is essential to the convenience of fresco-painting. In like manner the last finer coats should be lightly floated on, to insure their power of absorption.

Professor Hess, in the memoranda which he gave me on the subject, writes :—"The mortar for painting on is composed of lime, not in too caustic a state, and pure quartz sand. With regard to the lime, it should be well and uniformly manipulated, and should be entirely free from any small hard lumps. The sand should be very carefully washed, to cleanse it from clayey or saline particles, and should afterwards be dried in the open air—sand that is coarse, or unequal in grain, should be sifted: thus the mortar will be uniform in its texture. The proportion of sand to the lime is best learned from experience, and must depend upon the nature of the lime. If the mortar contains too much lime, it becomes incrusted too soon, is too smooth in surface, and easily cracks; if it contains too little, it is not easily floated, the successive patches (as the fresco proceeds) are not to be spread conveniently in difficult situations, and the mortar is not so lasting."

Marble dust and pozzolano have sometimes been substituted for sand in the preparation of the mortar for the intonaco.

Implements.

The implements used are wooden and glass floats; trowels of wood and iron; palette-knives of steel and bone; a trimming-knife; a bone or ivory stylus to run over the outline on the tracing-paper, in order to transfer it to the mortar ground; brushes of hog and otter hair—any other kind becoming burnt and curled by the lime. In using iron in connection with fresco-painting, it may be well to observe that it should be kept free from rust, and iron trowels should not be too forcibly pressed on the surface of the intonaco. A number of tin palettes with raised edges are also required, and a stone slab on which to grind the white, and mix the colours for the day's use.

The Colours.

The colours are chiefly simple earths, no vegetable and few mineral preparations can be used with safety. They are mixed with or ground in water, and kept in jars.

The colours most generally used are white, that is, lime which has been long kept, or rendered less caustic by repeated manipulations and drying, or which has been boiled as recommended by Armenini. Yellow, all kinds of ochres—burnt terra di sienna (according to Cornelius, the brightest particles selected at different stages of the burning, furnish very brilliant reds), oxides of iron, and lake-coloured burnt vitriol.

Brown—umber, raw and burnt, and burnt terra vert.

Black—burnt Cologne earth, as this, being freed from its vegetable ingredients, affords a pure black.

Purple—burnt vitriol, cobalt blue, and lake-coloured burnt vitriol.

Green—Verona green (terra vert), cobalt green, and chrome green (oxide of chromium).

Blue—ultramarine, cobalt, and the imitations of ultramarine. The last is most safely used for flat tints, but does not always mix well with other colours. These colours have been well tested, and for the most part, admit of being mixed in any way.

Other more brilliant colours, such as chrome yellow, vermilion, &c., have be entried in various ways, but have not in every case been found to stand. Colours prepared from animal and vegetable substances, cannot be used at all, as the lime destroys them. The quantities and changes of the various pigments used in fresco, and the best modes of employing them are minutely described by Palomino. Vermilion, the same authority says, will stand if passed over terra rossa. Pozzo gives the following directions for preparing vermilion for fresco. Take pure vermilion in powder, and having placed it in an earthenware vase, pour on it the water that boils up when lime is slaked in it; the water, which should be as pure

as possible, is then poured off, and the operation is often repeated. In this manner the vermilion is penetrated with the quality of the lime and always retains it. Cennini and Aronenini, on the other hand, distinctly say that vermilion will not stand in fresco.

Cennini's mode of preparing lime, as a white, is as follows, being precisely the same as that practised by modern fresco-painters. Take some of the "putty" from the lime-pit, and mix it well with water, pouring off the water as the lime settles, and adding fresh for eight days. The lime, divided into small cakes, is then placed in the sun to bleach. To shorten the process, the cakes, when dry, may be again moistened with water and well ground. This operation once or twice repeated, renders the lime perfectly white. If the lime be too fresh, an admixture of finely ground marble-dust is recommended to moderate its causticity.

Preparing to Paint.

We may now suppose that the wall to be decorated has been built according to the foregoing directions, is covered with the rough coat, or more technically the "rough cast," and that both are thoroughly dry and seasoned; that the artist has finished his cartoon, tracing, and sketch of colour; that at some convenient spot a bench is placed, on which are arranged the covered jars containing the colours ground in water, a large jar

of the prepared white, several marble slabs, with steel and bone palette-knives close at hand some large pieces of dry umber and several sponges; that a plentiful supply of boiled or distilled water is provided; that a number of palettes[1] such as have been described are clean and ready for use; that an ample supply of hog and otter-hair brushes are in the drawers of the bench; that the tracing has been tacked exactly in the place the painting will occupy; that the plasterer is ready with the fine mortar for the intonaco and the process may be commenced.

The painter now removes the tacks from the upper and left hand corner of the tracing, so that a portion of the tracing a little larger than the area he intends to paint may be turned down. The surface of the rough cast which is now exposed is wetted again and again by the plasterer till it ceases to absorb; the intonaco is then lightly floated on in two coats, the last being somewhat "fatter," that is to say containing a less proportion of sand. An interval of about ten minutes should elapse before the second or finishing coat is laid—the thickness of the two coats together should not exceed 3-16th of an inch. After these are well spread, the assistant may pass a roll of soft wet linen over the surface to get rid of the extreme smoothness, to remove the traces of the trowel, and

[1] The tin palettes with raised edges may be painted over with a coat or two of lime white.

slightly to stir the sand. The surface is next to be lightly passed over with a handkerchief, to remove any loose particles of sand which may adhere to it, and which in painting ceilings might get into the eyes; it appears that the old masters were in the habit of pressing and smoothing the intonaco by passing a trowel or float over paper when the day's work was completed. As soon as the mortar of the intonaco has sufficiently set, the tracing-paper is raised to its previous position, and the outline is traced upon it—sometimes this is effected by a stylus, which leaves an indented trace upon the mortar; at others, the outline upon the tracing-paper is punctured and pounced, but I have found pouncing unnecessary, if the tracing be on stout paper—as it generally is—for every puncture turns up a projecting edge on the reverse, so that if the finger be passed lightly over the smooth side of the punctured outline it leaves slight indentations corresponding with the punctured outline on the soft intonaco, which become more evident when the first thin wash of colour is passed over it. I prefer this mode of transferring the outline to any other; for unless the stylus or ivory point be cautiously used, it leaves unequal grooves in the soft intonaco, which are very unpleasant to paint to, and in pouncing through thin tracing-paper the outline may be washed out and lost too soon.

While the intonaco is in course of preparation the painter should mix all the gradations of tint

required for his day's work. With his coloured sketch near him, he prepares seven or more gradations, either of flesh or other tints; this should be done with great care, and each gradation tested on a block of dry umber, for, as the colours dry much lighter than painted, if he be not systematic his labour will be thrown away and the cause of endless vexation and disappointment.

In order to judge of the true value of the tints when dry, the pieces of dry umber before referred to, are used as tests. These, by rapidly absorbing the water from the tints touched upon them show pretty nearly what they will be. If the same tints be required in several successive days' work, sufficient of them should be mixed at once to execute the entire piece of drapery, or whatever else it may be, otherwise the different days' work will show as so many patches.

The intonaco may now be supposed sufficiently set, just bearing the pressure of the finger, and the day's work traced. The painter now passes a thin wash of one of his tints over the intonaco, using plenty of water, this discovers the outline and cleanses the surface, it is then left for ten minutes or a quarter of an hour.

The next proceeding is to indicate the light and shade faintly with the shade-tints—warm or powerful colour should be avoided in these first operations, they can better be added as the work proceeds; after a short time the work should be gone

over again, darkening and modelling the forms with greater care, and laying in the middle tints solidly—the tints may be softened into one another with a moderately moistened brush.

Clean pans of distilled water for diluting the tints should be supplied from time to time by the assistant. The work should again be left for twenty minutes or half an hour.

Thin glazing tints are now used; with these the artist gives the last delicate finishing touches, and puts in the high lights. As the mortar approaches the condition when it will no longer be safe to paint upon, the pencils are instantly sucked dry, and if the painting be continued after this rapid absorption ceases, after a few days it will be found as dry powder on the surface. Water is sometimes sprinkled on the intonaco to retard the approach of this condition, which varies with the state of the weather, quality of the lime, &c.

When the painter is unable to finish a portion at once, or is compelled to leave it during the day for a considerable time, the Munich artists have a contrivance which arrests the drying of the work. A board is padded on one side, the cushion being covered with wax-cloth ; a wet piece of fine linen is then spread over the fresh mortar and painting and pressed to the surface of the wall by the cushioned side of the board, while the other is buttressed firmly with a pole.

The day's work being finished, the superfluous

mortar is cut away with a knife, the edges of the finished portion being bevelled off to the ground or rough cast, the portion of the tracing-paper done with is then cut away—a fresh portion is turned down, and the next place to be filled with plaster indicated by the painter with a piece of chalk or charcoal. It is always better to follow up the portions most recently executed, otherwise the edges of the dry portion of the painting are liable to show stains. Thus the painting progresses like the filling up of a child's puzzle-map, piece by piece.

In cutting the mortar away care should be taken never to make a division in the middle of a mass of flesh, or of an unbroken light, but always where drapery or some object or its outline forms a boundary; for if this be not attended to, it will be almost impossible, in continuing the work the next day, to match the tints so that the junction be imperceptible; but by making these junctions correspond with the outlines of the composition, the patchwork, which is unavoidable, is successfully concealed. Round the intricate outlines of flowing hair and foliage it is impossible to make good joinings, the flowing portions of hair and the freer parts of foliage are executed with the background, and the joining made at some convenient place within these.

In the next day's operation the rough cast is to be wetted as before, and care must be also taken

to wet the edges of the intonaco previously painted. This requires to be done delicately with a brush, in order to secure the sufficient moistening of every part.

When any defect in the first operation is irretrievable, the spoiled portion is carefully cut out, and the process above described is renewed for that particular part. The same remedy is possible in reviewing the finished work, but here again care should be taken that the portion cut out should be bounded by definite lines, for the reasons before given. This attention to the nice adjustment of the successive portions of the work, so as to make one whole in the execution, is of great importance in fresco-painting.

Another practice of fresco-painters is, to mix some of the intonaco before laying it on the wall, to a middle tint of the colour required : its advantages are, that painting can be more rapidly executed and that accidental scratches are less evident, the colour in this case being incorporated with the mortar. When the painting is thoroughly dry, slight imperfections in the joining of the plaster or any other trifling defects, may be remedied, the medium being vinegar and yolk of egg.[1]

The decoration of public buildings in England is unfortunately too often an after-thought, whereas

[1] Distemper and crayons have also been used for this purpose, but it should be recollected that no retouchings of this nature are enduring.

the great Italian and Munich mural decorations were portions of the architect's original conceptions, and the painters were, in some instances, enabled to commence their designs and cartoons before the foundations of the edifices were laid.

There are other modes of painting which more or less resemble Fresco in their general effect, such as Fresco Secco, in which the usual fresco colours are used on a completely finished and thoroughly dry intonaco, the ground being merely resaturated with water previously to painting upon it, but it lacks the brilliancy of Buon Fresco; distemper, which is only fit for temporary works, and oil flattened with turpentine. All these modes of painting are free from the glossy surface which is incompatible with mural decoration, but are, in other respects wanting the virtues of pure fresco. Nevertheless these methods may occasionally be substituted for fresco, for works of the moment, or when circumstances preclude the adoption of the more ancient and durable means.

I am aware that fresco has of late somewhat fallen into disrepute with our painters on account of sundry failures in the palace at Westminster, but English painters are not exceptional in this respect; Italian and German painters also failed in their first use of fresco, for it requires considerable experience in properly preparing and using the material. The most enduring processes

generally require the most patience and perseverance in their study and acquirement; and I feel assured, unless the silicate of soda or water-glass method be found superior to fresco, that English painters only require a longer experience, by continuity of practice, to make them willingly accept fresco as the best method of executing works of art for important public buildings.

Mem. Cornelius used to lay the greatest stress on the necessity of using lime that had been long kept, since this comes in immediate contact with the colours, and is a colour itself. When this eminent artist, in conjunction with others, painted the house of the Chevalier Bartholdy, in Rome, an old mason, who had been employed under Mengs (a not unskilful fresco-painter), directed their attention to this point, and it so happened that they were then supplied with lime which had been preserved twelve years. The works alluded to, though the first executed by the modern German fresco-painters, have stood perfectly well. Other German and Italian fresco-painters do not consider it essential to keep the lime longer than ten or twelve months. Among other precautions, it is desirable to let the building itself dry well before painting upon the walls, and to use boiled water in moistening the surface and thinning the lime.

ENCAUSTIC PAINTING.

PAINTINGS executed with vehicles in which wax is combined in certain proportions, rank next to frescoes in architectonic propriety of effect and durability. With wax a vehicle may be composed nearly as free from gloss as fresco. Wax is very enduring, from the wonderful power it possesses to resist the action of acids; on this account it is used in the process of etching, and the Greeks saturated their marble sculptures with it to preserve them from atmospheric corrosion. But at present there is no general consent as to the true method of using wax as a vehicle, and it should be borne in mind that painting with any of its preparations is not properly encaustic unless heat is applied in the process; the application of heat, however, may ultimately be found an unnecessary operation by our advanced chemical science; if so, the title encaustic will have to be changed. I may, therefore, perhaps render the arts some service by bringing together the records of inquiries and experiments instituted at different times, to elucidate the ancient method of encaustic painting, and re-

vive its practice. Whatever be the method ultimately adopted, it will probably be preferred by many in this country to fresco, as it promises a somewhat richer range of colour, a more powerful effect, and to be a less encumbered process.

Ancient authors often make mention of encaustic, which, if it had been described simply by this word, signifying "executed by fire," one might suppose to have been a species of enamel-painting. But the expressions, "encausto pingere," "pictura encaustica," "ceris pingere," "picturam inurere," used by Pliny and other ancient writers, make it clear that some other species of painting is meant. We have no ancient pictures of this description, and therefore the precise manner adopted by the ancients is not completely developed, though many moderns have closely investigated the subject and described their processes. At what time, and by whom, this species of painting was first invented is not determined by antiquaries, although it appears to have been practised in the fourth and fifth centuries. Count Caylus and M. Bachelier (a painter), were the first in modern times who made experiments in this branch of art about the year 1749. Some years after this, Count Caylus presented to the Academy of Painting at Paris his ideas and experiments on the subject of the ancient manner of painting in encaustic. In 1754 the Count had a head of Minerva painted by Mons. Vien after the process

described by himself, and presented it to the Academy of Sciences in 1755. This induced Mons. Bachelier to recommence his experiments, with better success; but his manner of painting in encaustic differed from the ancient as described by Pliny, he did not therefore discover the real ancient manner; after this he made other experiments with the same object, all of which differed from the process as described by Caylus and others.

Pliny, in a passage relating to encaustic painting, distinguishes three species. 1. That in which they used a stylus, and painted on ivory or polished wood (cestro in ebore), for which purpose they drew the outlines on the wood or ivory, previously saturated with some certain colour; the point of the stylus or stigma served for this operation, and its broad or blade end to clear off the small filaments that arose from the outlines made by the stylus in the wax preparation. 2. The next manner appears to have been where the wax, previously impregnated with colour, was spread over the surface of the picture with the spatula, the wax-colours being previously prepared and formed into small cylinders for use. By the side of the painter stood a brazier, which was used to heat the spatula with which the colours were smoothly spread after the outlines were completed, and thus the picture was proceeded with and finished. 3. The third method

was by painting with a brush dipped into wax liquefied by fire; by this method the colours attained considerable hardness, and could not be damaged either by the heat of the sun or the deleterious effects of sea-water. It was thus that they painted their ships with emblems, which decorations were finally smoothed and polished. This kind of encaustic, therefore, was styled "ship-painting."

The following important observations are translated from the Italian of the Chevalier Lorgna, who deeply investigated the subject in a small but valuable tract called "Un discorso sulla Cera Punica." The ancients (says this author), according to Pliny, used three species of painting, and in all three they used heat.

We have never thoroughly known the nature of the Punic wax, which was anciently used, and which, after all, was the essential ingredient of the ancient painting in encaustic. The Chevalier having praised the genius and industry of M. Requeno[1] and M. Bachelier, who also treated upon the subject, but who did not fully succeed in finding out the true way of making the said wax, quotes the passage in Pliny: "Punica fit hoc modo," &c., see Pliny's Nat. Hist. i. 21, c. 14; and asserts with many other writers, that Pliny's *nitre* is not the *nitre* of the moderns, properly so called, but

[1] Saggi sul Ristabilimento dell' antica Arte de Greci e Romani Pittori. Parma, 1787.

the *natron* of the ancients, viz., the native salt which is found crystallized, in Egypt and other hot countries, in sands surrounding lakes of salt water; it must not, however, be mistaken for the natron of the new nomenclature of the College of Physicians, which is the new name of the mineral alkali.

From the plains which were once covered by the sea, and from the environs of the salt lakes of Lower Egypt, from Tripoli and Tunis, as also in the adjacent parts of ancient Carthage, the *natron*, that same *natron* which, under the name of nitre, the Carthaginians, according to Pliny, used in preparing their wax, is to this day extracted, and hence it was called Punic Wax.

"I began now," says Lorgna, "successively to try my experiments, first with three parts of wax and one of natron, and then with four of wax, and so on, till I used twenty parts of white melted wax with one only of natron, with as much water as was just sufficient to dissolve the natron. I held the mixture in an iron vessel over a slow fire, stirring it gently with a *wooden* spatula, till the two substances thickened by evaporation; and, in closely uniting, the mass by degress assumed the consistence of butter and the colour of milk. I then removed it from the fire, and put it in the shade to let it harden and perfect itself in the open air. This natron was extracted from the ley of kali of Malta, evaporated till it was dry; it may also be extracted from the kali of Spain,

Sicily, Sardinia, and from that of Tunis and of Tripoli, which may be procured without much difficulty. The wax being cooled, it liquefied in water, and a milky emulsion resulted from it like that which could be made with the best Venetian soap."

Pliny, in another place, c. 7, 1–23, gives further directions for the manner of using encaustic painting on walls; but as it concerns the antiquary more than the artist, I have forborne making the quotation. It begins at these words, "Ut parietis siccato cera punica," &c.

As to making use of this wax in painting in encaustic, the Chevalier says, that magnificent and repeated experiments were made in the apartments of the Count Giovani Batista Gasola, by the Italian painter, Signor Antonio Paccheri. He dissolved the Punic wax, when it was not yet so much hardened as to require to be "igni resoluta," as expressed by Pliny, with pure water slightly infused with gum arabic, instead of sarcocolla, mentioned by Pliny. He afterwards melted and mixed his colours with this wax so liquefied as he would have done with oil, and proceeded to paint in the same manner; nor were the colours seen to run or alter in the least; and the mixture was so flexible that the pencil ran smoother with it than it would have done with oil. The painting being dry, he used the caustic over it, and rubbed it with linen cloths, by which the colours acquired a

peculiar vivacity and brightness which they had not before the caustic and the rubbing had been effected.

Many years since, Count Caylus,[1] a member of the French Academy, to whom we have recently alluded, undertook to explain an obscure passage in Pliny (xxxv. 39), who somewhere records in his works that "the ancients painted with burnt wax," and we have traditional evidence that pictures of this kind were very durable. The passage which the Count undertook to explain we may suppose to be the following:—"Ceris pingere ac picturam inurere quis primus excogitaverit non constat; quidam Aristides inventum putant, postea consummatum a Praxitele; sed aliquanto vetustiores Encausticæ picturæ existere, ut Polygnoti et Nicanoris et Arcesilai Pariorum. Lysippus quoque Æginæ picturæ suae inscripsit ἐνέκαυσεν, quod profecto non fecisset nisi encaustica inventa;" which has been translated—"Who first invented to paint with (or in) wax, and burn in (or fix) the picture with fire, is not certainly known. Some think Aristides invented it, and that Praxiteles brought it to perfection; but there were pictures by masters of a much older date, such as of Polygnotus, Nicanor and Arcesilaus, all artists of Paros. Lysippus wrote upon his pictures, *burnt in*, which he would not have done if the encaustic method had not been invented then."

[1] Phil. Tran. Vol. 49, Part II.

This was the passage which the Count undertook to clear up, by trying all the different possible ways of painting in wax, and after many experiments he hit upon a very simple method, of which, in order to excite the curiosity of the public, he made a secret.

The several artists who were desirous of knowing by what means the Count made the discovery, tried a great number of experiments, of which only two are worth mentioning.

The first was to melt wax and oil of turpentine together, and use it for mixing the colours. But this method does not at all explain Pliny's meaning, because wax, in this way of managing it, is not burnt; besides, this method is defective, the oil of turpentine dries too fast, and does not allow the painter sufficient time to blend and unite his colours.

The second method is very ingenious, and seems to tally with Pliny's description very well; it is as follows: the wax is melted with strong lixivium of salt of tartar, and with this the colours are ground. When the picture is finished, it is placed before the fire, and heated by degrees; the wax melts, swells, and is bloated up upon the picture; the picture is then gradually removed from the fire, and the colours, without being injuriously affected by the operation of the fire, become unalterable; spirits of wine having been burnt upon them without doing the least harm.

The following, however, which is Count Caylus's method, is much simpler, and is that by which the head of the Minerva was painted, so much admired by the connoisseurs of that day.

First.—The cloth or wood designed for the picture is waxed over, by rubbing it simply with a piece of beeswax.

Secondly.—The colours are mixed up with pure water, but as these colours will not adhere to the wax, the whole ground must be rubbed over with chalk or whiting before the colour is applied.

Thirdly.—When the picture is dry, it is put near the fire, whereby the wax is melted and absorbs the colours.

It must be allowed that nothing can be more simple than this process; and it is thought that this kind of painting is capable of withstanding the weather and lasting longer than painting in oil.

The effect produced by the surface of this kind of painting is very singular, nor can one have any notion of it without seeing it. The colours have not the gloss of oil-painting, so that the picture may be seen in any light; in short, there can be no dazzling reflection from pictures painted in this manner to baffle the eyes of the spectator: the colours, when so secured, are firm, and will bear washing; and have a property which is perhaps

more important still, viz., that exposure to smoke and foul vapours merely leaves a deposit on the surface without injuring the work. By simple exposure to the dew, the head of the Minerva became as clean as when first painted.

These, with slight alterations, are all the contents of the letter laid before the Royal Society by the Abbé Mazens, who accompanied it with a series of acute and learned observations which, with an extensive knowledge, show an inclination to prove that the Count's method could not be the encaustic of the ancients, and that "encausto pingendi" could be nothing else but enamelling. But whether the Count's method fully corresponds with Pliny's description or not, any discovery tending to establish an effective and simple method of painting with wax is valuable to the mural painter. The "encausto pingendi" of the ancients, however, could not have been enamelling in the strict sense, nor could it have been painting produced in the same manner as by encaustic tiles, or encaustic tesseræ; but that it must have been something akin to the Count's process would appear from the clear and expressive words of Pliny, "Ceris pingere ac picturam inurere," and who in speaking of ship-painting—"resolutis igni ceris penicillis utendi"—bears silent proof that the Latin verb "urere" ought not to be understood in so strong a sense as applied to enamelling.

We can scarcely suppose the Latin tongue to have been so defective in Pliny's time as not to afford distinct names for such opposite things as enamelling and ship-painting. Their ships must have had either iron or copper sides at least, to have withstood the process of firing such as enamel undergoes, and it is difficult to imagine a Roman first-rate man-of-war enamelled.

Probably Pliny knew nothing at all about the matter from his own experience, but trusted to the description of others, and merely used the technology in vogue. We have daily instances of such a kind. Arts and trades abound with special jargon, which, if taken literally, would prove anything but analogous to its subject. Writers who pay no regard to this, and relate without scrutinizing what they are told, must of course often be unintelligible. Hence it is that most of our dictionaries on arts and sciences, and very many books upon painting, are so perplexing, and outfog Pliny in obscurity.

If all books upon arts and sciences had been, or could be, written by practical men, we should have clearer notions upon most subjects; we might not have the finest language, but if a guide leads us the right way we need not mind the style of his dress.

It is said that encaustic painting is susceptible of all the freedom and delicacy of any other whatsoever; you may leave off or cherish your work

at pleasure; you cannot fatigue your colour, nor are you subject to the inconvenience attending oil-painting—of waiting till it is dry. All the effect and sweetness of oil-painting (it is said) may be obtained—the colours are not liable to fade or change; no damp can affect it, no corrosive will hurt it; nor can the colours crack and fall in shivers from the canvas.

In experimenting on this system, oil-colours were compared with those fixed with wax, in order to judge better and with greater precision their variations. By this it happened that oil-colours were often painted over a waxed ground; in this case they always appeared brighter and cleaner than the very same colours painted upon an oil ground; at least it was imagined that dead colouring in colour and water, and finishing in oil, was an experiment worth trying. For this purpose a head by Sir Godfrey Kneller was copied in colour and water, fixed with wax, and afterwards finished in oil; this, it was said, far surpassed in brilliancy a copy of the same head painted entirely in oil.

The groundwork of the painting, whether linen, canvas, or plaster, must be waxed over either by spreading the wax, by rubbing, or some other convenient method, and care should be taken that the picture does not exceed the size of the inner margin of the stretching-frame in using linen or canvas, and that battens do not come too near

the surface in painting upon plaster, as the wood, by absorbing the wax in the after processes, would injure the effect of the portions of the picture immediately over it.

Colours used in oil-painting are fit for this manner and no others. There are a few of these even that ought to be omitted.

Let all the colours be very finely ground, *simply with water;* allot to each colour a distinct vessel. From the colours so ground compose all the different principal tints which the nature of your intended work will require.

As most of the colours acquire a deeper hue when moistened, and some deeper still when fixed with wax, it will be necessary, to prevent perplexity in the execution, to have a guide for retouching (as in fresco) either when the picture is finished and dry, before heat is applied, or after it has been thus fixed; for this purpose the following expedient may be adopted:—

Take two slips of cloth, about a foot long and three or four inches wide, wax them as beforementioned, then upon the one slip range pattern stripes of the colours already mixed; do the same on the other piece of cloth, according to their order and degradation; mark every tint with a number, write down upon paper every number, and of what the tint is composed. This done, and the colours dry, cut your cloth across all the tints, bring one half of each near the fire, and by

melting the wax, fix them; keep the remaining halves unfixed. So that by rejoining and comparing the fixed and unfixed colours together, it may be judged what strength every tint will acquire, and by their reciprocal references you will with certainty be enabled to alter or imitate, deepen or heighten any tint, either before or after the colours are fixed.

If the portions of the picture which require to be retouched be large and already dry, take a large soft hair-pencil and moisten the portions to be altered, or the whole picture, and repaint till the eye is satisfied. The experienced encaustic painter can retouch without resorting to this expedient. While the picture is wet, it appears very nearly what it will be when fixed; when dry, it appears grey, like distemper, and deficient in force. In large pictures on canvas the picture may be, with great ease and security, kept damp by moistening it from the back with a large brush.

When the colouring is finished and dry, it has to be fixed by heat; this, in the case of small works, may be done by holding the pictures before a clear fire, bringing them gradually to within a foot of it, never closer. In mural works, however, this part of the process must be performed by brazier or hot iron. When it is perceived by the hue and shining of the painted surface that all the colour is imbued with the wax, remove the

picture gradually from the fire and it will be completed.

If any spot be observed deficient in wax, put a little finely scraped on the back, and diffuse it with a hot iron. There is no danger in applying moderate heat to the work over and over again. But if a certain temperature be exceeded bubbles will appear on the surface, and the picture will be rendered rough and uneven.

Never heat the wax too hastily, nor cool it too suddenly, for the point to achieve is not to bring the wax too forward. If, however, it has been brought too much to the surface, the gradual cooling allows it to retire, and be partially re-absorbed by the ground.

To retouch the encaustic picture when the colours have been fixed, temper and use the mixed tints with a little spirits of wine; repaint and again apply heat.

Count Caylus's method of preparing the linen or canvas ground consists in stretching it upon a frame, and holding it horizontally over, or perpendicularly before a fire (at a distance proportioned to its intensity), and rubbing it with wax till it is saturated. The canvas thus prepared would, when cool, be fit to paint upon, but that water-colours roll on such a surface; it is therefore necessary to rub it over first with chalk or whiting. But it is thought that painting upon the wax by the intervention of the whiting, is not

so convenient as upon the cloth or canvas before it is imbued and filled with the wax, as it then holds the colour firmly in its fibres, which in the other method is easily moved and difficult to repair. The virtue of the intervening whiting is in a great measure destroyed after the first painting. By painting immediately on the cloth or canvas the work will be more solid and lasting, because the colours will not simply lie on the surface of the wax, but canvas, wax, and colour will be intimately incorporated.

For painting upon walls or plaster where the wax cannot be applied at the back, the Count's system must be practised: the rough grain of the plaster will take and retain a sufficient quantity of colour to ensure solidity. Upon canvas the picture may be entirely finished before fixing; but in painting upon plaster it would be better to proceed as in oil-painting, first laying in the subject broadly and fixing before finishing it. A steel palette-knife should be avoided, as in other painting; it is said that Van Dyck never used other than a spatula of horn.

The distinguishing characteristics of encaustic painting are—

First.—The colours have all the airiness of water-colours combined with the strength of oil, thus escaping the defects of both.

Second.—A picture may be looked at in any light; the colours are fresh and vivacious without being glaring.

Third.—The colours are firm without being brittle, and scratches may easily be repaired.

For large works which may be much exposed to the air, simple beeswax is considered preferable to bleached wax.

The following experiments were tried in order to test the durability of encaustic colours and their power of resisting the effects of time and weather, as compared with those of oil :—

The same colours were prepared in oil and encaustic, and the strips of canvas bearing them were each cut into five equal pieces.

First.—One piece of each was exposed in the open air to the influences of sun, dew, wind, and rain.

Secondly.—One piece of each was nailed to the wall of a damp cellar.

Thirdly.—One piece of each was nailed to a kitchen ceiling, near the chimney, where a fire was kept the year round.

Fourthly.—A piece of each was nailed to the side of an ordinary dwelling-room.

Fifthly.—One piece of each was put between several quires of paper and placed in a close drawer.

These were left in their various positions for twenty-seven months, when they were collected, and after being washed, compared with the same tints freshly painted in encaustic and oil; the results were—

No. 1.—The old tints in encaustic seemed to have suffered when compared with the new, but in respect to the contemporary oil-tints, remained bright. Both sets of old tints were then washed with a brush and pure water; the encaustic tints recovered a little, but not so the oil. The encaustic was brought near the fire, and most of the tints recovered their brilliancy—pinks, yellow orpiment, lake, terra di sienna, and verditer excepted; the first of them was partly gone, what remained was dull; the second had become whiter; the lake, which had not suffered in beauty, lighter; the terra di sienna, crude, rough, and dirty; and the verditer duller.

No. 3 seemed to have suffered by smoke, but after washing the tints with a stout brush and soap and water, the original hue in nearly all was regained; the exceptions were pinks, yellow orpiment, smalt, and verditer. The first of these was sensibly decayed; the second had grown darker, inclining towards red orpiment; the third dull, but where mixed with Prussian blue, became as bright as new; verditer was dark and dull.

Nos. 2, 4, 5, were just as bright as the new.

The oil-colours did not so well withstand these tests.

No. 1.—The tints were weak, dull and dim; some entirely gone.

No. 2.—Freckled with all sorts of hues, not to be washed off.

No. 3.—Darker; some dull, others dirty, some entirely gone.

No. 4.—Yellower and duller.

No. 5.—Yellow; spotted, as if varnished with gall.

The encaustic tints were fixed with virgin wax; it was found, however, that the same tints, painted at the same time, upon cloth prepared with common yellow beeswax, stood better in the open air.

The foregoing tints were afterwards washed with a strong lixivium of potash, vinegar, spirits of wine, a solution of sea-salt, and aqua fortis. By this operation the oil-colours were entirely destroyed; the encaustic suffered nothing, only the smalt grew darker; but after scraping and exposing it to the fire it recovered its tone.

It having been perceived that oil-colours painted upon a waxed ground always appeared brighter than upon one of oil, observations were made with the microscope, and it was found that oil-colours upon an oil-ground, five or six hours after their application, undergo great fermentation, which continues till dry, when they begin to overcast, and by degrees the surface is covered with a yellowish-grey substance, not to be washed or rubbed off. Among the very same colours painted upon an encaustic ground, no such fermentation could be perceived. From which it may be conjectured that the priming ordinarily worked upon is more

the cause of the colours changing than that the colours themselves suffer alteration; very likely owing to the dessicated saline particles of the oil which are dissolved by, and thus mix with, the new oil and colours; as to the super-abundant salts of the priming, which is generally composed of the coarsest oil and colours, and frequently half chalk.[1]

Mr. Werner, of Neustadt, found the following process very effectual in making wax soluble in water:—For each pound of white wax he took twenty-four ounces of potash, which he dissolved in two pints of water, warming it gently. In this ley he boiled the wax, cut into little bits, for half an hour, after which he removed it from the fire and allowed it to cool. The wax rises to the surface of the liquor in the form of a white saponaceous matter, which, being triturated with water, produces a sort of emulsion, which he called wax-milk, or encaustic wax, and may be applied to well-cleaned pictures, furniture, or leather. In an hour after the application the article should be rubbed with a piece of woollen cloth, which will cause the pictures to have a better effect, and other materials coated with it to assume a peculiar brightness. Another advantage of this preparation of wax is, that it can be mixed with all kinds of colours, and consequently be

[1] This, at least, is the opinion of Muntz.

applied in a single operation. It is also useful to fix water-colours.

At the end of the last century many experiments were made by Mrs. Hooker, of Rottingdean, in the county of Sussex, to establish a method of painting in wax. This lady, who united practice with theory, received a gold palette from the Society of Arts for her investigation in this branch of art. Her account is printed in the tenth volume of the Society's Transactions for the year 1792, under the name of Miss Emma Jane Greenland. Her first communication, accompanied with specimens of this mode of painting, was made in the year 1786; a specimen was preserved in the Society's rooms in the Adelphi. Mrs. Hooker appears to have been indefatigable in her pursuit; for in the year 1807 she made a further communication to the Society of the result of no less than fifty experiments per day during more than four months; and having some practical knowledge, she painted very successfully several pictures in her own method. The following is the purport of this lady's two communications to the Society, which may be entitled—A method of preparing and applying a composition for painting in imitation of the ancients:—

Put into a glazed earthen vessel four ounces and a half of gum-arabic, and eight ounces or half a pint, wine measure, of cold spring-water; when the gum is dissolved, stir in, over a slow

fire, seven ounces of gum-mastic, continually stirring and beating hard with a spoon, in order to dissolve the gum-mastic. When sufficiently boiled the mixture will no longer appear transparent, but will become opaque and stiff, like a paste. As soon as this is the case, and the gum-water and mastic are quite boiling, without taking them off the fire, add five ounces of white wax, broken into small pieces; stir and beat till the wax is perfectly melted and boils; then take the composition off the fire, as boiling it longer than necessary would harden the wax and prevent it afterwards mixing so well with water. When the composition is taken off the fire, it should be beaten hard whilst hot (but not boiling) in the glazed earthen vessel; mix with it, by degrees, a pint or sixteen ounces more of cold spring-water, then strain the composition to get rid of impurities, and bottle it. The composition, if properly made, should be like a cream, and the colours when mixed with it, as smooth as with oil. The method of using the composition is to mix with it, on a china palette, any colours in powder which may be required, to the usual consistency of oil-colours, then paint with fair water.

The colours, when mixed with the composition, may be laid on either thick or thin, as best suits the subject to be painted. If the colours should dry when mixed with the composition, they may again be rendered fit for use by putting a little

water over them; but it saves trouble to keep them moist. In painting with this composition the colours blend without difficulty when wet, and even when dry the tints may be easily united by means of a brush and a very small quantity of water. The painting being finished, put some white wax into a glazed earthen vessel over a slow fire, and when melted, but not boiling, with a hard brush cover the painting with the wax; when cold, take a moderately hot iron, such as is used for ironing linen, and which will not "hiss" when put to the usual test, and draw it lightly over the wax. The painting will appear as if under a cloud, till the wax and the substance the picture is painted upon are perfectly cold; but, if when cold the painting should not appear sufficiently clear, it may be held before the fire at such a distance as will melt the wax slowly, or the wax may be melted by holding a hot iron at a proper distance from it, especially before such portions of the picture as should not appear sufficiently transparent or brilliant; for the oftener heat is applied to the picture the greater will be the transparency and brilliancy of colouring; but the contrary effect would be produced if too sudden or too great a degree of heat were applied, or for too long a time, as it would draw the wax too much to the surface and probably crack the paint. Should the coat of wax put over the painting appear, when finished, in any way uneven, it may be remedied by drawing a

moderately hot iron over it again, or even by scraping it with a knife; and should the wax, by too great or too long application of heat, form into bubbles at particular spots, they may be made to subside by a re-application of moderate heat, or by passing some smooth hard substance over them. When the picture is cold, rub it with a fine linen cloth. Paintings may be executed in this manner upon well battened panels, canvas, paper, or plaster. Plaster and other surfaces require no other preparation than a coating of the composition.

It would be equally practicable to paint with wax alone, dissolved in gum-water in the following manner:—Take twelve ounces, or three quarters of a pint of cold spring-water, and four ounces and a half of gum-arabic, put them into a glazed earthen vessel, and when the gum is dissolved, add eight ounces of white wax. Put the earthen vessel, with the gum-water and wax, upon a slow fire, and stir them until the wax is dissolved, and when the mixture has boiled a few minutes, take it off the fire and throw it into a basin, as by remaining in the hot earthen vessel the wax would become rather hard; beat the gum-water and wax till quite cold. As there is but a small proportion of water in comparison to the quantity of gum and wax, it would be necessary to use some fair water in mixing this composition with the colours. Should the composition be so made as to occasion the ingredients to separate in the

bottle, it may be rendered equally serviceable by being well shaken before used. Another very serviceable quality in the vehicle for painting was discovered by Mrs. Hooker, which was, that the composition which had remained in a bottle since the year 1792, in which time it had grown dry and become as solid as wax, returned to a cream-like consistence, and became again as fit to mix with colours as when it was first compounded, by putting upon it for a short time a little cold water.

The following, however, is the most recent addition to my list of encaustic processes:—Dissolve in a large pipkin, half full of hot turpentine, as much gum[1] damar as it will take up. Melt from two to two and a half of the wax tablets sold by chemists, in a pint of this varnish; when cold, it should be just consistent enough to stand up on the palette. If too thin, heat it again, and add wax; if too thick, add turpentine. This vehicle may be used with the ordinary oil-colours. Before commencing your work heat the wall, and rub in as much vehicle as it will absorb, and after the work is finished it should be re-heated, as a safeguard against its peeling from the stone.

Works upon Encaustic: Pliny, 1, 21, c. 14; 1, 23, c. 7. Saggi sul Ristabilimento dell' antica Arte de Greci e Romani Pittori, by Vicenzo Requeno, Parma, 1787. Un discorso sulla Cera Punica, by Chev. Lorgna.

[1] ½ lb. gum makes about 1½ pints varnish.

MOSAIC.

Mosaic, or Musaic, is a method of executing decorations with small slabs or cubes, called tesseræ, of coloured marbles, glass, enamel, porcelain, terra-cotta, &c.[1] These tesseræ are carefully laid, and fixed with mastic, either on the walls to be decorated or upon some portable ground or backing, conformably to the drawing and colour-gradations of ornamental or pictorial designs previously prepared by some experienced painter. The preliminary designs, generally executed upon paper, are called cartoons. In comprehending the means and method, it will be perceived that mosaic can but imperfectly render highly finished, complete art; for square or even cut coloured tesseræ cannot be subtilly blended to rival the chiaro-oscura and colour of pictures. The more minute the tesseræ, the closer, of course, is the possible approximation to the effect of painting; but as these are diminished the cost of the work

[1] There is also another species of Mosaic termed *pietre dure*, which consists in inlaying coloured marbles. A modern specimen of this method, by the Baron Triqueti, is inserted in one of the spandrils of the cloisters, University College, London.

increases, and it is, under any circumstances, an expensive mode of decoration; for the labour of both the painter and the skilled workman have to be highly paid.[1] This method of executing works of art should only be employed in large public buildings, and at distances sufficiently remote from the spectator's eye, for it is only fit to render designs made with reference to its technical limitations and incompleteness. But as a counterbalance to its imperfections, it is perhaps the most durable of all the methods of mural decoration. Dr. Salviati, of Venice, has recently introduced, and done much to popularize, mosaic work in this country, by his renderings of some of that series of designs for the portraits of the Great Painters in the arcades of the South Kensington Museum, after designs by Watts and Stephens in St. Paul's, and of Clayton for the Albert Memorial and Wolsey Chapel.

"The combined action of the moisture and severe frost of any northern climate," says Sir

[1] "Taking the various qualities of Mosaic which may be fitly used for decorative purposes, the price would vary from about 30*s*. the square foot to £4, or, at the utmost, £5 for the finest. This includes the fixing, but not, of course, the price of the cartoon. When these prices are compared with what an artist of eminence, and fully employed, would receive for the execution of a great fresco, or any elaborate mural decoration; in fact, with what the artists engaged on the wall-paintings in the Houses of Parliament have received, they will be found I think very moderate."—*Vide* Layard's Lecture, Royal Institute of British Architects.

Matthew Digby Wyatt, "is such as must always, I fear, render but little durable any extensive application of mosaic in small tesseræ as external decorations. To a great extent, therefore, architects will have to look upon it as an internal, or at any rate, a protected embellishment. It is, of course, a coloured incrustation applicable to any structural surfaces which it may be desirable to enrich; and its appropriate design may be strictly determined by very nearly the same laws which should govern the distribution of polychromatic decoration, executed through any other medium upon similar surfaces. The rationale of these laws has been by no one better illustrated than by Sir Charles Eastlake in his invaluable reports to the Fine Arts Commission; and it is better that I should refer to what he has so well written, than attempt to give now any paraphrase of them.[1] The chief exceptional conditions are—firstly, the expense of mosaic, which entails simplicity; secondly, the extremely vivid way in which it reflects light and exhibits local colours partially, demanding judgment to adapt the design to the mode of lighting; and thirdly, its limitations, under ordinary circumstances, as a means of artistic expression, which lead to the prudent avoidance or sparing employment of many of those pictorial elements, such as perspective, foreshortening, lively action, or

[1] The principal of these will be found at the commencement of the article on Fresco-painting.

complicated chiaroscuro, which are proper and agreeable sources of effect in mural paintings executed with more tractable vehicles. That which the designer will probably at first feel to be his greatest difficulty, the arrangement of the cement-joints which attach the tesseræ to one another, will, when once he has mastered the principles upon which they should be disposed, prove a ready and most essential means of heightening his effects. The jointing is to a mosaic designer exactly what the lines and reticulations of an engraving or etching are to an engraver: and the rules of taste which apply to the one equally apply to the other. For instance, as the engraver's lines, by convexity or concavity, express the undulations of drapery and modelling of surfaces advancing to or retreating from, or above or below the spectator's eye, so precisely should the directions of the jointing of a piece of pictorial mosaic. Again, as the regular ruling or cross-hatching of an engraved half-tint is made to give value to the broken lights and shades of the leading figures, to which by these vivid contrasts attention has to be attracted, so should the uniformity of the jointing, with even-sized tesseræ, diminish the brilliancy of a mosaic background, breaking up the light which would otherwise be so strongly reflected from, say, a white or golden background, as to quite kill the effect of the figures or ornaments to be relieved

upon it. Another point which should be carefully attended to in arranging the jointing, is to allow a row of tesseræ of the same colour as the ground to always follow every leading contour profiled upon the background. The use of this rule, which was invariably followed by all good mosaicists, is to prevent the directions of the generally horizontal and vertical jointing lines of the background from cutting awkwardly against the profiles, which the eye should be allowed to follow without being led off into other channels, or distracted by the occurrence of irregular-shaped tesseræ next to leading forms. This re-duplication, as it were, of mosaic outline, has almost the effect of the lead-line in stained glass, and is not much less essential to good effect. It is highly gratifying to observe the degree of judgment with which the mosaicist has emphasised the designer's intention by a judicious treatment of the jointing in the Russian, Salviati's, and the South Kensington specimens now exhibited. It is always to be remembered that at the distance from the eye at which mosaics are usually likely to be placed, mechanical defects disappear, but that artistic mistakes betray themselves, despite the most perfect mechanical execution. Hence it is far better to spend time, thought, and money in getting really first-rate cartoons than in endeavouring to bring the tesseræ to fine joints or microscopic minuteness. In mounting to the summit

of the great dome of St. Peter's glimpses are caught from time to time of the nature of the mosaic work; and the observer who, from below, may have fancied the whole to have been wrought with great exactness, will find that the work is of the coarsest description, with joints in which often a good-sized pencil might be laid. Owing to its judicious design, however, the effect of the whole is eminently satisfactory when viewed from the floor of the cathedral.

"It may be well to remember also that although mosaic is, as it were painting, it is something more in its relation to the structure it decorates—it has become 'bone of its bone;' and in virtue of its intimate and permanent union, is especially bound to live in peace and harmony. As a good wife should make conspicuous the virtues of the husband she adorns, should enhance his virtues and screen his defects, so should a well-devised system of mosaic give, by predominant vertical lines, height to a structure in which height is wanting; and, by predominant horizontal lines, length where length is needed. Brilliancy may be wrought out of darkness by allowing gold grounds and luminous colours to prevail: while the eye in another building, 'faint with excess of light,' may be refreshed by a preponderance of cool, deep, and quiet tones. String courses and borders, archivalts and imposts, bands and friezes, should be treated as permanent frames to perma-

nent pictures, essential by their rectangularity or other simple geometrical character, to afford the eye a ready means of testing all adjoining and more complex forms by contrast. Need I say that where the skeleton of the picture's composition is tossed about in lively action, a stronger boundary of more vivid and contrasted hues must inclose it as a corrective, than when the motive-power of the picture is of a quieter and simpler structure? That is the reason why the great Venetian pictures demand such massive framing, while the more serene compositions of the early Florentine and Siennese schools look best when separated from one another by little else than narrow bands of flat and softly tinted ornaments. In the same way in mosaic the rigid saints of the early Byzantine school, with their evenly balanced limbs and perpendicular draperies, need little else than vertical palm-trees, or inscriptions, or upright staves placed between them, to keep them architectonic; while the later corresponding figures of the Italian school, with their swaying lines, require often actual insertion into recesses to keep them even reasonably quiet.

"Such are a few of the most important theoretical points which have occurred to me, but there are other and more abstruse details to be mastered before perfect success can be achieved, but upon these I cannot with propriety enter in this report. Such are those which arise out of

the different artistic conventions which form graduated stages between the crudest mode of, as it were, symbolising nature and the most highly perfected form of imitative art. While an intimate acquaintance with the specific conditions of each of these stages—which are to the designer what keys are to the musical composer—will be a great assistance to the mosaicist, an ignorance of, or an indifference to them, will lead him into great trouble and confusion."

The same authority concludes the previous remarks with the following wisdom:—"Let me, then, express a hope that it may not be considered necessary to retain the defects and mannerism either of too much or too little academic knowledge peculiar to ancient, mediæval, or modern times, but that we may rather concur in doing the very best any of us can with this art without pedantry or a slavish deference to the past."

Although this branch of art was well known and much practised by the ancients, Pliny has spoken of no express style, nor has he particularized any of the artists who wrought in it. The origin of mosaic-work must, apparently, be sought in the East, the rich carpets of which were imitated in hard stone. It is probable that the art was known to the Phœnicians, but to the Greeks its perfection and glory are to be attributed. From Greece it passed, with other ornamental points of knowledge, into Rome towards the end of the

Republic, the Italian conquerors of Greece transporting from that country into their own the most beautiful specimens in the shape of pavements, &c., which they could discover. Sylla was the first Roman who caused a piece of mosaic-work of any magnitude to be executed, for the Temple of Fortune at Prænestе (now Palæstrina), which mosaic, at least a great portion of it, still exists.[1] At first the Romans ornamented in this manner the pavements of buildings merely, but after a while the walls and arched ceilings also. The tents of the generals, in time of war, were also paved thus, to keep off the humidity of the ground, as Suetonius reports of the tent of Julius Cæsar. The invention of coloured glass was a great discovery for the purposes of mosaic.

When the dark ages had driven the elegant arts out of Italy, mosaic-work, as well as painting and sculpture, was preserved a considerable time amongst the Byzantine Greeks, who used it to adorn their churches. Towards the conclusion of the thirteenth century an Italian of the name of Tafi learnt to work in mosaic of a Greek called Apollonius, who decorated the cathedral of St. Mark at Venice, where is still preserved an admirable pavement executed by him. But in general these works are wanting in design, are in bad taste, and equally bad in colouring.[2] Since then, in Italy,

[1] Barberini palace.

[2] Per contra, *vide* Layard's remarks.

the art has been brought to a high degree of perfection. Pope Clement VIII., at the commencement of the seventeenth century, contributed much to this end by adorning with mosaic all the interior part of the dome of St. Peter's. Among the earliest artists employed thereon were Paul Rossetti and Francis Zucchi.

Among the most beautiful mosaics preserved in the pavements or walls of ancient buildings, we may particularize that found in a chamber of Hadrian's villa, near Tivoli; the Palæstrina mosaic before alluded to, and which is remarkable for the light which its delineations throw on the history, local and natural, of Egypt. In the villa Albani is a beautiful mosaic discovered in the territory of Urbino, which represents a school of philosophers, and another depicting the history of Hesione, daughter of Priam. In 1763 was found, in a villa near Pompeii, probably that of the Emperor Claudius, a mosaic representiug three females with comic masks, and playing on various instruments. The name of the artist (Diascorides of Samos), was engraven thereon in Greek character. There are, besides, innumerable others which at sundry times have been dug up, exhibiting more or less merit and excellence in the art, and which are commonly described as tesselated pavements.

Sir Digby Wyatt considers the historical phases of pictorial mosaic to have been seven: viz., first, Classical; second, Latin; third, Byzantine; fourth,

Greco-Italian; fifth, Italian monumental; sixth, Italian portable; seventh, Mosaic in *pietre dure*.

"It is sufficient to say, that the art of putting together small cubes or tesseræ, as they are technically called, of different substances, so as to form patterns or figures in one or more colours, is of very ancient date, and was even known to the earliest civilized nations, such as the Egyptians, Assyrians, and Babylonians. Mosaic was applied to the decoration of walls and pavements, and was extensively used, especially for the latter purpose, by the Greeks and Romans in their public and private buildings. Owing to the durability of the materials generally employed,—such as hard marbles and porphyries, enamels, or glass and terra-cotta,—mosaic has defied the ravages of time probably more effectively than any other architectural decoration. To this day the remains of mosaic pavements are the most usual indication of Roman sites in England and in many countries of Europe, as well as in parts of Asia and Africa. But pictorial mosaic, on a really large scale, was first used for the decoration of public buildings during the later days of the Roman empire, and during the supremacy of Byzantium, and in those countries which derived their civilization and arts from Rome and her Eastern successor. It took its chief development after the spread of Christianity, and in the decoration of Christian edifices, so that we may call it essentially a Christian art.

The most magnificent examples of ancient times were to be found in the churches of Christian Rome, Constantinople, and Ravenna.

"The chief features, then, of this Christian mosaic are the vast extent of wall-surface to which it was applied; its most frequent use on domes, apses, and curved surfaces; and the representations of figures and ornaments on a gold ground, although a gold ground was not always used, as in the early mosaics in St. Pudenziana and St. Prassedo, and in the baptistry of St. Giovanni Laterano, in Rome. In Italy, to this mosaic the epithet Byzantine is indiscriminately though wrongly applied. It is true that the art flourished in the East when it had almost died away in the West, and that Italy owes, to a great extent, to Byzantine artists its revival; but a direct Roman influence, as Sir Digby Wyatt has well pointed out, may be traced in Italian mosaics up to the eighth and even ninth century. The art, however, flourished contemporaneously in the eastern and western parts of the empire.

"The extreme richness of this mode of decoration, and, at the same time, its grand and solemn character when used on large masses, made it especially applicable to religious purposes; and it appears to have been generally used for the embellishment of churches, although there are several recorded instances of royal palaces having been very profusely adorned with it. A vast mass

of ancient mosaic work has perished: no small amount in the East is still covered with white-wash and plaster. There scarcely seems to have been a church or baptistry of any importance built within the precincts of the Byzantine empire that had not more or less mosaic decoration. The fashion spread across the Alps, and we find Charlemagne decorating his basilicas and palaces with mosaic.

"This general use of mosaic led to improvements in the materials employed. Marbles and porphyries could no longer be exclusively used, and earthenware did not promise the required durability. Enamels or vitreous substances, which the Italians call 'smalti,' and which had not been unknown in earlier times, were mixed with them. The art, too, of enclosing gold leaf within layers of glass, a very difficult one, and requiring great nicety of manipulation, was also discovered (there is no evidence, I believe, that it was known in classic times); and thus the gold ground, one of the peculiar features of this mosaic, could be effectively executed. Of these early mosaics, the most remarkable now preserved, are those of St. Sophia, a church at Salonica, the baptistry of Constantine, or St. Costanza, at Rome, which show a curious mixture of Pagan and Christian figures and symbols, and the style of which almost approaches that of the painted ornaments in the baths of Titus; of the apse of

St. Pudenziana, also of the fourth century; of the monumental chapel of Galla Placidia, and of the baptistry of Ravenna, and of St. Maria Maggiore at Rome, of the fifth century; and those of St. Vitale, of St. Appolonaris in Clesse, and of St. Apollison Nuovo in Ravenna, of the sixth century. Unfortunately, few of the early mosaics at Rome and even Ravenna are free from considerable restoration, and their original character is in many instances much destroyed: frequently these restorations are even made with coloured plaster.

"I will now direct your attention to those edifices which furnish the best examples of mosaic decoration and are most deserving of study, with a view to the use of mosaic in this country. I exclude St. Sophia, because the mosaics on its walls are for the most part concealed by plaster. In its original state it must have been, as far as the interior is concerned, one of the most glorious buildings the world ever saw. In no other, probably, were such vast spaces covered with the richest mosaic decoration; and every part that was not so covered seems to have been panelled with the richest and most beautiful marbles. I had the good fortune to see St. Sophia when under repair, and when the plaster had been removed under the direction of an Italian architect, Sig. Fossati. The effect of this partial revival was truly magnificent. Some idea of the vastness and richness of the details may be obtained from

Salzenberg's work. I would particularly dwell upon the extraordinary preservation of these mosaics. They had been covered since the Turkish conquest, and probably had not undergone much restoration in previous times. The examples, therefore, of mosaic, which I would most particularly point out for imitation, if the time should ever come, as I hope it will, when people in this country will be duly impressed with the value of internal decoration, are St. Mark's, Venice; Monreale and the Capella Reale, at Palermo; and the basilicas of Ravenna. I do not place these buildings in order of date, but according to importance as illustrating mosaic decoration.

"St. Mark's, taken as a whole, is the most perfect example of internal decoration in the world. In other edifices you probably find instances of details and detached mosaics more beautiful than any in St. Mark's; but you will nowhere find an example of one grand and noble conception so thoroughly and completely carried out. It furnishes, too, the richest and most valuable chapter in the history of mosaic, for in this one building we have specimens of mosaics extending over a period between the eleventh, or certainly the beginning of the twelfth, and the end of the thirteenth century, and consequently comprising a variety of styles and showing many different modes of employing mosaic. Every

square foot of the church, the baptistry and the vestibule, domes, apses, sides and pavement, is covered with mosaic work, except where the richest marbles panel the lower parts of the walls. There is no uncovered or naked space. The eye, I may say the mind, is completely satisfied. Nothing looks as if it were unfinished, or as if there yet remained anything to be done. I cannot imagine any one to enter this glorious edifice without being impressed with the solemnity and majesty, and at the same time, with the exquisite beauty and harmony of all around him; without feeling that, if we are to have decorations in our sacred edifices on a large scale, and so as to add to their religious character, and at the same time to produce a sense of enjoyment of the purest description, mosaic is the most appropriate of all decoration. The lustrous surface of the enamels, the large masses of gold ground, the richness of the colour, produce an infinite variety of the most beautiful effects, ever changing as the sun changes its place. St. Mark's is never the same. Enter at any hour of the day, in summer or in winter, and whether the sky be clear or overcast, and you will ever be surprised and delighted by some new and unexpected effect. In the morning, the recesses of the nave-end, the grand solitary figures of Christ, the Virgin, and the Evangelists, will be revealed to you. At midday, when the full light of a southern sky is equally diffused over the

interior, the many domes and vaults are so illuminated that every detail in the vast maze of figures and ornament can be plainly detected. And when the rays of the setting sun stream through the western window upon the grand apse above the high altar, the majestic form of the enthroned Saviour seems to float in a sea of burnished gold. Even when the shades of night are fast gathering over the lower parts of the building, a mysterious and solemn light lingers for a time on the golden domes and vaults of the upper, like the bright clouds which float in the sky after a Venetian sunset."[1]

It was calculated by the Duke of Serra di Falco, that no less than 97,973 Sicilian palms (rather less than a foot each) of enamel mosaic (opus Alexandrinum), and 13,041 of *pietra dura* mosaic cover the basilica of Monreale, near Palermo, requiring, for three years, 150 mosaicists to execute them. The mosaics in the basilicas of Ravenna deserve the most careful study, as belonging to the best period of early Christian mosaic art. They are especially valuable to the artist as affording some of the finest examples of the treatment of pictorial mosaic, and of the technical qualities of the material. The tomb of the Empress Galla

[1] *Vide* Lecture on Mosaic Decorations, by The Rt. Hon. A. H. Layard, M.P.; Sectional Papers, Royal Institute of British Architects, Nov., 1868; and *The Builder* of the 5th and 12th December, 1868.

Placidia, still maintains, as a whole, much of its ancient character and beauty, and contains the mosaic of the "Good Shepherd," one of the most perfect specimens of the art that can be found. For the processional treatment of subjects, and for ancient costume and architecture, the basilicas of Ravenna furnish most excellent examples, especially the church of St. Apollinare Nuovo. Indeed, at no period were the use and capabilities of mosaic so thoroughly well understood as in the fourth and fifth and early part of the sixth centuries.

Fresco-painting and mosaic have distinct and separate attributes and capabilities, and when both can be employed under equally favourable conditions, they need not interfere with one another. If mosaic then can be used effectively and advantageously in sacred edifices, there is no reason why it should not with equal propriety be employed in secular buildings of sufficient scale. All that is required for this purpose is a knowledge of the principles which regulate its proper application, and the capability of the material. The elaborate mosaic-work, chiefly practised at Rome, which aims at the production of easel-pictures and altar-pieces rather than at architectural decoration should be avoided.

"Legitimate mosaic decoration, like all true architectural decoration, should, in the very first place, be made subservient to the architecture."

One clear and well-defined conception should characterize a national monument. "When this identity of conception is apparent in a building, however inferior it may be in certain details to another edifice in which this homogeneity is wanting, it will always be far superior to it in the general effect that it will produce." Mosaic, as all mural decoration, should be simple in its design, and not aim at subtle gradations of colour and perspective; its technical difficulties, especially in the earliest times, have confined it to single figures and processional compositions; later it has attempted all the variety of pictorial effect attained in a more facile material; in the first examples it is too bald, in the latter too florid. There is a similar disparity between the earlier and later works in fresco, and Michael Angelo, in his first experiments in the Sistine Chapel, found that he had attempted too great a perspective in the arrangement of his figures. The cartoons of Raffael would appear to hit the mean between redundancy and baldness of design for architecture. Nothing can well be more disagreeable in the decorations of a building than the maintenance of one bald plane in its decorations, like those on an Etruscan vase. The use of mosaic should be confined to the loftiest spaces, the vaults and domes of public edifices, where the imperfections of the method become invisible, and the broadest and simplest treatment may be adopted. At the present moment, a mode-

ration of ideas on this subject is very necessary, for with our usual English one-sided tendency, seeing that in the decadence of the art the mosaicists attempted too much, we immediately conclude that the opposite style is right, without considering that the first efforts of art are always meagre, its last redundant, and that there is between these extremes a period of true reserved power of design and execution.

The extreme modes of treatment are perhaps those instanced by Mr. Layard, viz.: "The semi-dome over the most northern, and the lunette over the adjoining exterior entrance, to St. Mark's Church. In the first instance, the original mosaic of the thirteenth or fourteenth century (its precise date is doubtful) represents a procession of figures bearing the body of St. Mark to the church, a view of which as it appeared when the work was executed is seen in the background. The subject, simply and somewhat rudely treated, harmonizes completely with the surrounding architecture. The mosaic of the adjoining lunette represents the Doge and Venetian magistrates venerating the body of St. Mark. It was executed from a cartoon by Rizzi, and is probably one of the finest known examples of enamel-mosaic, both as regards execution and the wonderful beauty and richness of the colours, especially the blues, purples, and golds. But this mosaic, however admirable in design and execution, does not harmonize with

the architecture. It looks like a fine picture suspended on the façade, and which might have been hung anywhere else; consequently its effect is infinitely less pleasing than that of the earlier, simpler, and ruder mosaic. What the effect must have been before the original mosaics were removed to receive the later, may to some extent be judged of by Gentil Bellini's great picture in the Academia, in which the façade of St. Mark's is represented, with almost photographic minuteness, as it appeared in the fifteenth century. No one will doubt that it was superior to that produced by the modern mosaicists." And Mr. Layard adds, "that in order to increase its effect, almost all good pictorial mosaic with which I am acquainted is surrounded by a band of appropriate ornament, the width of which depends on the elevation and position of the mosaic picture."

The designs for mosaics, whether pictorial or simply ornamental, should be immediately under the superintendence of an artist; it was because the painters and sculptors in Italy were also architects that such grand, entirely consistent, monumental edifices were raised in that country. The possession of all the mere constructive skill in the world does not constitute an artist, and will not make the mere architect competent to superintend the decorations of a building. The great desideratum is the artist, he alone is fit to be the master-builder, and to control both the construction and

decoration of an edifice. And he is the greatest artist who, in the knowledge of human form, action, and passion, is greatest; it is immaterial what kind of material he has to conform. He is either the great painter, sculptor, or architect—or three combined.

"Although the chief merit of the mosaic must depend upon the designer of the cartoon, much is left to the skill and judgment of the mosaicist who executes it. It is surprising how much effect may be produced by a judicious selection of tesseræ of different sizes for different parts, by the mixture of tints in large masses of one colour, such as a gold ground, so as to avoid monotony of tone, and by the dexterity with which the arrangement of the tesseræ is made to follow leading lines and the undulations of flesh or drapery. The interval between the tesseræ must be regulated according to the distance, and can also be made to contribute to the general effect. These things, and the proper selection and matching of the tints form the duty of the mosaicist."

I quite agree with the eminent authority quoted that pictorial decoration might be introduced into our monumental edifices much more extensively than it has hitherto been, very much to the public advantage—not only into the Houses of Parliament, but our museums, picture galleries, public offices, courts of law, town halls, railway stations, &c.; yet I by no means

think that mosaic is the material to be brought into close proximity with the eye; the decorations of such spaces as can be conveniently contemplated by the public should be executed by some more complete method, such as Fresco, Encaustic, or Water-Glass. I am sure that the first and last of these have not yet had a fair trial, the public employment vouchsafed to painters has been of so desultory a kind, that there have not been opportunities for gaining that breadth of experience which is absolutely necessary to learn how to paint with certainty, and to secure durability by the preparation of the materials. I must confess, however, that the following is an important consideration in the use of mosaics in England, and especially in London, viz., "The facility with which dirt and the discoloration produced by smoke and soot can be removed from its surface either by simple washing or by the employment of an acid, without the least detriment to its brilliancy. I understand some of the most ancient mosaics at Ravenna, dating from the fifth century, have been cleaned, and that they are as bright in colour as when first executed." But Buon Fresco and Water-Glass paintings ought to bear cleaning with water. Dusting and breading is usually sufficient with good fresco.

"In England we have never had a school of mosaicists. The few specimens of ancient mosaics that we possess, such as those in Westmin-

ster Abbey, were executed by Italians. An attempt was made, four or five years ago, by Mr. Cole, with his usual zeal for the promotion of Applied Art in this country, to found a school of workers in mosaic, who were to employ tesseræ of terra-cotta,—or, as they are technically called, 'ceramic tesseræ,'—instead of enamel, for figures and ornaments. Some very creditable specimens were produced, principally by Messrs. Minton and Co., and Messrs. Simpson and Co., but the attempt does not appear to have been altogether successful. For certain purposes these terra-cotta or ceramic tesseræ are sufficiently effective, but they lack the richness, brilliancy, and luminous quality of enamel; and certain colours, such as reds and purples, cannot be produced, and they can never equal the effect of the gold of the Byzantine mosaics. Moreover, the gold being applied externally, and not protected by a film of glass, is liable to tarnish and to injury. As regards the durability of ceramic mosaics, I hesitate to give an opinion after the solemn warning of our President[1] in his opening address of the session, against the indiscriminate use of terra-cotta, at least for external decoration. I will only mention this fact, that in repairing the mosaics of St. Mark's, it has been found that, whilst the ancient tesseræ in enamel are perfectly preserved, those in terra-cotta and other materials (for such were

[1] The President of the Royal Institute of British Architects.

mixed with the enamels) have either perished or have greatly suffered. But mosaics in enamel have been executed with considerable success by several eminent firms in this country. I may particularly mention some of the full-length figures in the principal hall of the Museum at South Kensington, by Messrs. Rust and Co., and by Messrs. Harley, Fisher and Co. Some of the enamels used were, I am informed, produced in England by Messrs. Powell, of Whitefriars; but the greater part were, I believe, obtained from abroad, mostly from St. Petersburg, where, as is well known, a manufactory of mosaic, which has produced some remarkable works, was founded by the Imperial Government, under the direction of Sig. Bonefede, a distinguished Roman mosaicist, who is only recently dead.

"In Italy the traditions of the workers in mosaics have been handed down through centuries, and, although at times the art has been very low, and indeed was scarcely practised at all, yet it has never altogether died out in the Peninsula. At Monreale certain families of mosaicists have been employed from generation to generation in keeping up and repairing the mosaics of the cathedral. At Rome, owing to the demand for elaborate mosaic in the reproduction of pictures, and for furniture and personal ornaments, the skill of the mosaicist was almost exclusively directed to those objects; but still the ancient traditions were not lost, and

workmen were without difficulty found to execute the series of mosaics which adorn the walls of the new basilica of St. Paola. At Venice the old secrets were still preserved in the island of Murano, which had been celebrated since the twelfth and thirteenth centuries for the beauty of its manufactures in glass and for its enamels; but the sad condition to which the mosaic art had been reduced may be judged of by the restorations and renovations which, during the last century and the early part of the present, were executed in St. Mark's. A few years ago a poor glass-blower of Murano, named Lorenzo Radi, applied himself with that singular intelligence and perseverance which are not uncommon among Italian artists, to the improvement of the manufacture of enamel mosaics, and to the application of some of those secrets which were traditionally preserved in the island. He particularly turned his attention to the manufacture of gold mosaic. The success which attended his experiments attracted the attention of Dr. Salviati, a lawyer of Venice, and a gentleman of much ability and ingenuity, who perceived the value of his discoveries, and foresaw that they might be applied to the revival of mosaic decoration. He accordingly entered into an arrangement with Radi, and opened an establishment at Venice for mosaic work, obtaining artists from Rome to instruct Venetian youths in this art. In former times mosaic work, having

to be executed upon the walls, required considerable time and labour, and was consequently very expensive. The mosaicist had to copy the cartoon on the wall itself, fixing the tesseræ one by one in the cement prepared to receive them. Dr. Salviati succeeded in avoiding the necessity of working upon the spot by an ingenious process, which, however, is only applicable to decorative mosaic, and cannot be used where much delicacy of work and extreme nicety in the gradation of tints are required. He taught the workmen to execute the cartoon on the reverse side, the face of the mosaic being downwards. The tesseræ are fastened with common paste to sheets of coarse brown paper, on which the cartoon is traced. When the work is finished, it has only to be fixed with cement upon the wall destined to receive it, and the brown paper is then removed from the face of it. This process requires considerable skill and practice, especially when figures have to be executed, but is perfectly successful. Thus the decoration of many hundred square feet of surface can be forwarded from Venice to any part of the world—to America or to India—with safety and at little cost. Having thus found the means of executing mosaics in the establishment at Venice, and having trained a number of young Venetians to the art, and much improved the quality of his enamels, he endeavoured to introduce this mode of decoration into foreign countries.

It was chiefly in England that he met with success. The increased feeling for colour and decoration, and the gradual improvement in the public taste which had taken place in this country, chiefly through the enlightened influence of the Prince Consort, were very favourable to his attempt. It was principally through the knowledge of art and well-known taste of the Queen, that Dr. Salviati obtained his first important commission —the decoration of the Wolsey Chapel at Windsor, and that of the Albert Memorial in Hyde Park.

"Of course, figures require, under all circumstances, more careful execution and more skilful workmen than mere ornament. As regards the relative cost of tints, the reds and purples are the most expensive, on account of the materials used in them. The gold mosaic, but especially the silver, which is more difficult to obtain than the gold, is more costly than common tints. To show the requirements of a mosaic establishment, I may mention, that in order to execute in a satisfactory manner the cartoons which have hitherto been confided to Dr. Salviati, a stock of nearly 1,500 tints have been brought together, for the most part produced on the company's premises at Murano. I may point out that any quality or tint of gold may be obtained by darkening or lightening the colour of the glass upon which the gold leaf is laid, or by using a film of coloured

instead of transparent glass over it; or, the brightness of the gold may be deadened by roughing the surface of the outer film of glass with the wheel. The architect or painter can, consequently, choose the quality of gold which best suits his work or his taste."[1]

Among the most distinguished artists in this style may be enumerated the following:—Gaddo de Gaddis, who died in 1312; Angelo Bondone, called Giotto, died 1336; Dom. Ghirlandajo, died 1493; Pietro Oda, died 1500; Franc and Valerio Zuccari, in 1545; Alex. and Franc. Scalza, Ferd. Sermei, Giov. Tratini, Louis Ricci, Tom. Brandus, Gab. Mercanti, towards 1550; Louis Cajetano, 1559; Ang. Sabattini, Birnasconi, Ambr. Giosio, Vitalde Massa, P. Lambert de Cortona, Cruciano de Maceratta, Giov. Cataneo, Fr. Zuccha, P. Rossetti, and Cæsar Torelli, who departed this life towards the end of the fifteenth century; Giov. Calandra died 1644, having invented a mastic for fixing the pieces in a manner more solid than had hitherto been practised; Giov. Merlini, Giov. Ciachetti, Bottini, Cosm. Chermar, Giov. Giorgi, Lor. Bottini, Giov. Bianchi, Carlo, Centinelli, and others whom Baldinucci cites as the first artists employed in the fabrication of the mosaics for the Gallery of Florence, and who died about the middle of the seventeenth century. At the same epoch flourished also Marc. Spina, Oraz. Manetta,

[1] Layard's Lecture on Mosaic previously referred to.

and Matth. Piccioni, Marcel. Provenzale, who died 1693; La Valette, 1710; Nic. Brocchi, 1713; Phil. Cocchi, Nic. Onuphrio, Bern. Regolo, Funo, Guil. Palat, Franc. Fiano. Some thirty or forty years since, France possessed in Paris a school of artists in mosaic, directed by M. Belloni. Since when, the Russian and Venetian manufactories, the former under the direction of Sig. Bonefede, and the latter of Dr. Salviati, have become famous. The principal works which may be consulted on the theory and practice of mosaic are the following:—Ciampini, *On the Mosaics of Sacred and Profane Buildings*, Rome, 1690, 1699, two vols., folio. Furietti, *On Mosaics*, Rome, 1752, 4to. The above works were written in Latin; a French translation of them appeared in Paris in 1768, in 8vo, entitled *Essai sur la Peinture en Mosaïque*, par M. de Vielle; *ensemble une Dissertation sur le Pierre Spéculaire des Anciens:* which work comprehends treatises on the origin of mosaic, on the etymology of the word, on the different methods of the Greek artists, &c. Paciaudi, in his book *De Sacris Romanorum Balneis*, Rome, 1748, has also treated of this subject, so likewise has Buonarotti in his *Observations on the Glass of the Ancients*, 4to, Florence, 1716. Piacenza, in his first vol., of his edition of *Notizie dei Professori del Disegno da Cimabue in quâ*, by Baldinucci, 4to, Tor., 1768, has inserted an intelligent paper on the subject of mosaics. Fougeroux de Bondaroy devotes a por-

tion of his work *Recherches sur les Ruines d'Herculanum*, Paris, 1770, 8vo, to a treatise *Sur la Fabrique des Mosaïques*. Caylus has also treated of them in his *Essai sur la Manière de Peindre en Marbre*, in the *Memoirs of the Academy of Inscriptions*, vol. xxix. Gurlitt, a German author, has published a dissertation on the same subject.

The most curious works containing descriptions and explanations of antique mosaics, are :—*Opus Musivum erutum ex Ruderibus Villæ Hadriani*, Florence, 1779. *Observations sur la Mosaïque des Anciens,à l'occasion de quelques Tableaux en Mosaïque, qui se trouvent à la Galerie des Peintures de l'Electeur Palatin*, by the Abbé Hæffelin, in the *Comment. Histor.* Academiæ Theodoro Palatinæ, vol. v., No. 3, p. 89, Mannheim, 1783, 4to. This author compares mosaics in glass and stone with the pictures executed among the native Americans in feathers of birds, and also with tapestry. *Explication de la Mosaïque de Palæstrine*, by the Abbé Barthelemy, Paris, 1760, 4to ; and also in the *Memoirs of the Academy*, vol. xxx. Kircher, in his *Latium*, and Montfauçon, in the fourth vol. of his *Supplément de l'Antiquité expliquée*, gives an analysis of that celebrated monument of art. *Osservazioni di Ennio—Quirino Visconte, su due Musaïci antichi istoriati*, Parma, 1788, 4to. *Description de la Mosaïque trouvée à Séville. Mosaïque d'Italica*, by Alexandre la Borde, 1802, containing excellent plates. Salzenberg's work. The

Lectures of A. H. Layard, M.P., Nov. 1868, and Matthew Digby Wyatt, F.S.A, March, 1862, at the Royal Institute of British Architects. *Reports on the Paris Universal Exhibition*, 1867, vol. ii.; *On Decoration*, by Matthew Digby Wyatt, F.S.A.

OIL-PAINTING.

Until the invention of oil-painting, attributed to Van Eyck, painters were chiefly occupied in decorating the walls of public buildings, and were restrained in the treatment and effect of their works, within well-defined limits, by architectonic conditions and method of execution. The introduction of oil-painting, however, gradually changed the whole character of pictorial art; for it rendered the painter independent of the architect, and released him from those limitations. Pictures on panel and canvas gradually increased in number as architecture and mural painting declined. For a time, the "motives" which influenced the great mural painters in their monumental works, were transferred to their easel-pictures. Evenness of plane, or slight depth of perspective in the grouping of the figures, which is suited to compositions designed for the walls of large buildings, was preserved in the oil-pictures of Raphael, Da Vinci, Domenechino, and others, and gave that distinctive largeness of character which has been designated the "grand style."

But as painters gradually withdrew from mural decoration, they diverged from its simplicity, and availed themselves of the greater license which is possible in oil-painting. The more the influence of architecture over the painter waned, the greater became the excesses of the painter in composition, colour, and effect, till at last, the variety of ways in which oil-colours could be manipulated, dissipated all system in their use, as well as of any common tendency and grand aim in art. At this juncture a return to mural painting and the simple style of design and execution which it involves, would be highly beneficial, and would not only raise the aim and style of pictorial art, but improve the very practice of oil-painting itself—for a temporary abandonment of the more facile method might be profitably occupied in considering whether the true method of oil-painting has not been lost, seeing that the old masters produced, with even a more limited scale of pigments, much more potent and magical effects than since. The traditions of oil-painting, I am inclined to think, lapsed about the time of Lely. I am now merely referring to the method of painting ; for, from Lely's time there may be observed a want of that well-sustained solidity and determinateness of execution which mark his own and his predecessors' works, however widely they may differ in subject and treatment.

The solidity and determinateness alluded to, is

very manifestly felt when a collection of the old is brought into juxta-position with one of comparatively modern painters.

After Lely's time, painters appear to have commenced oil-painting *de novo*, and to have followed their own devices in practising it. Sir Joshua, however, evidently strove to recover the old solidity, combined with transparency, and doubtless did so temporarily; but his mode of working, not his taste, was at fault. The consequence is, all that remain are the wrecks of many of his fine intentions. The works of some of his immediate successors show by their cracked, delapidated state, that the execution was still more at fault. Strange vehicles substituted for older and simpler ones, and over-haste in using them, may have been partly the reason; but there was probably a deeper-seated error than these, namely, an ignorance of the true process of oil-painting, a want of a scientific perception of the causes of the brilliancy and solidity of colours on prepared grounds.

Transparency in Oil-Painting.

The most brilliant effects of colour are those derived from jewels and painted glass. This splendour arises from light itself passing through a coloured transparent medium. There is nothing that can compete in art, in actual brilliancy, with painted glass, for the painter's white *ground* is but

a poor substitute for light itself. This fact, if it be well considered, affords the clue to the best mode of obtaining brilliancy in oil-painting. The pigments used by the oil-painter may be broadly divided into transparent and opaque colours; the transparent ones may be considered the representatives of the coloured glass, and would, if spread out in films between two pieces of white glass and held to the light, produce similar effects. Now, the oil-painter's only substitute for the light of the sky behind glass being the purest white ground, on canvas or panel, transparent colours laid dexterously over such a ground exhibit their greatest fulness and perfection of colour; and, thus used, closely approximate the effect of paintings upon glass. But the novice, imagining the source of brilliancy to be his lightest pigments, seeks to obtain brightness by mixing them, especially white with the transparent colours, only to find his aim frustrated by leaden tones, and he very seldom probes to the root of his failure. If he, however, experiment, as it has been suggested, the cause will soon be discovered as well as the importance of allowing the ground to shine through the colour, which is in fact the only way to obtain fulness, richness, and transparency of colour in oil-painting.

The following question then may very naturally occur to the reader. Could a picture be entirely painted with oil-colours transparently used over

a white ground, as water-colours are used upon paper? It is possible to a certain extent, but this mode of oil-painting requires great care and skill to preserve the colours clear; for there are impurities in the pigments which interfere with even painting and there also is great difficulty in managing the half-tints between the lights and shades; the extreme depths of shadow too, from requiring more colour, are actually in advance of the lights in emboss; whereas the reverse ought to obtain. Another drawback is the glazed appearance throughout the work, and the difficulty of expressing diversity of texture; this is not the case in water-colour painting, because the surface of the paper and the pigments are free from gloss. Although a great degree of richness of colour is attainable by this transparent method, it is almost impossible with the greatest skill to surmount the difficulties of execution which it presents.

Opacity or Solidity.

Having considered Transparency, we turn to its opposite, Opacity. The opaque pigments are only relatively so, and if rendered in thin films from the brush may derive an advantage from the white ground shining through them. But as opacity as well as transparency in nature has to be represented, we have also to enquire how this quality is attainable. The former process

no longer helps us, as in the present case, the light is not required to shine through, but to be reflected from the surface, as from opaque bodies themselves. And consequently the process for producing solidity is the very reverse of that which produces transparency, or by passing *light* opaque colours over a transparent *dark* ground of a different tone. The value of this means of producing even solid surfaces is well known to house painters, who "prime" walls darker than the proposed final coat. Between the extremes of transparency and opacity, all the intermediate gradations may be produced, in painting, by the proportioned adjustment of the two means just described.

Painting into Wet White, and into a Glaze on a White Ground.

1. Painting into Wet White upon a White Ground.—Having described the means for producing the two opposite qualities in oil-painting, we shall have to revert to the pure white ground on which it may be supposed a design is correctly outlined. For that fatiguing, or messing the colours which inevitably ensues upon uncertainty in placing them, would render transparent painting, or the following modifications of it, vexatious if not futile. In the prefatory observations on transparency, the use of thin glazes of colour without any admixture of white was referred too, but there is a much better method of

using the white ground, on a similar though somewhat modified principle, viz., by painting into a film of wet white. The layer of white forms a most agreeable surface to work upon, the transparent colours ride, as it were, upon it, are easily manipulated, and form charming greys in combination with it. The difficulties of painting in entirely transparent colour are obviated by this means, and the processes of oil and water-colour painting brought into close resemblance.

The design then being carefully outlined on the canvas, let us select for an example for practice a piece of green drapery. Take a brush containing a little vehicle, and rub or "work it out" over that portion of the surface to be painted, taking care to remove any fulness or superfluity of vehicle from the canvas with a clean brush, so that the thinnest possible film only remain. Then with a brush filled, but not coated, with white, spread the pigment over the same space and in the same thrifty manner; if it should happen to be spread with too great a prodigality at first, take a dry brush and "work it off" till a thin film only remains; a final "tapping" with the same brush will completely effect the even distribution of the white. The space to be painted being thus prepared, the outline appearing sufficiently distinct through the white, begin to paint the lights and shades of green with tones rather lighter than finally required; advance as far as possible the

modelling of the forms at one painting. When dry and properly cleansed, complete the modelling; and finally, when this too is thoroughly hard, glaze the hue required over the masses of light, and bring up the shades to their proper strength. The opaque white spread over the surface in the commencement, renders the white oil-ground a very fair equivalent for the white paper in water-colour in the lights; but the white ground with the transparent colour over it in the shades has considerably the advantage in oil. Great care should be taken that each day's painting should be thoroughly dry, and then well washed before attempting to advance the work.

2. Painting into a *Glaze* on a White Ground.—A glaze in oil-painting is a film of transparent colour spread over the ground to be painted upon, or over any portion of a work already painted—painting into a glaze is another mode of using the white ground. Let the outline be *drawn in* on a canvas thus prepared, and let the object to be painted, as before, be a piece of green drapery. Spread the vehicle over, or a little beyond the space to be painted, having previously taken the precautions of cleaning, &c., recommended in the description of the former process. Then spread a half-tone of the shade of the green, rather cooler than that ultimately required, over the space to be painted, and work the colour evenly and thinly from the brush. The outline will in this process

also show through the glaze, but not so clearly as in the former process, which is now reversed, for instead of painting the darks into the white, the lights are painted into the dark glaze, and the modelling completed by darker transparent tones in the depths. The successive paintings are so similar to those of 2 and 3 of the former process, as not to require separate descriptions. Both methods may be followed, with a little experience, to almost identical results. But perhaps the former on a fair trial will be preferred for several reasons, but chiefly for the clear preservation of the lights, and the pleasant working of the wet white. A variation upon this method may be adopted after the half-tone is spread, by wiping out the lights before painting; the process then gains in quickness, but loses somewhat in impasto. This will be better understood after a description of the following method.

Impasto.

Although very pleasing results may be obtained either by painting into *wet white* or into a *glaze*, they yet leave the important quality of impasto undeveloped. Let it be well understood, however, that by the word impasto, no careless, hap-hazard, plastering of paint upon a canvas is implied, but that painstaking and scientific adjustment, or graduation of emboss, from the deepest shade up

to the highest light. The greatest emboss within the legitimate limits of painting is indeed trifling, yet the preservation of a certain relative gradation within those limits, gives most completely that solidity, roundness and relief which is only to be found in consummate works of art. To make use of impasto to this end, however, requires great patience—a waiting for results not much in accordance with the flurried, eager, competitive haste of the present day. We have shown both the value of transparency and opacity, and a perfectly executed oil-painting exhibits these qualities passing by subtle gradations, the one into the other. Experience proves that the appearance of roundness and relief in objects, is materially assisted by the graduated super-position of opaque colour in the successive paintings of each portion of the work. Again, we commence upon a canvas having the lightest possible prepared ground; but the first proceeding is now, to glaze it all over, say with a dark, rich, transparent brown, and if varnish can be depended upon, this should be used in combination with the oil in mixing the colour for this purpose. Let this coat of glaze get thoroughly dry and hard before proceeding. Upon this, draw in the outline of your composition, previously studied in a full-sized drawing. Let us, however, for mere experiment, again paint a piece of green drapery. Begin by in-

dicating the light and shade with a tone a few degrees lighter, and more opaque than the dark ground, use no lighter tone in the first painting, but the brush fuller in the masses of light, working the colours out towards, and thoroughly into, the shades; repeat the process, with a brighter hue in each successive painting, till the full roundness of effect is attained. In this manner every fresh painting lies within narrower and narrower limits, and increases in emboss till the final high lights are touched in; high lights now, indeed, in an actual as well as a metaphorical sense. If too light a tone of green were to be used in the first painting it would appear like haze over the dark ground. When great brilliancy of hue is required in the lights, it will be better to complete the modelling in a much lighter key, even up to white itself, and finally "glaze up" the work to richness. In fact, the primary white ground may be thus recovered, for the sake of the advantages it was shown to possess.[1] By this method the peculiar excellences of the two former may be united and enhanced by the special virtues of the impasto, which completes the desirable cycle of qualities. By the means just described, the natural gradation of tone from light to shade is more

[1] That is to say, the light and shade, or form may be completed prior to colouring.

truly rendered than by any other method. The process itself assists the production of subtilty in gradation, and enables the dexterous hand to effect easily what even the keenest eye can scarcely follow. This method, with perhaps slight modifications, should be rigorously carried out under all circumstances. Experience alone can teach us how to modify a system. I have only endeavoured to generalize the various qualities involved in oil-painting.

An intermediate system, however, may be adopted, that of laying the ground of each portion of the design to be painted in a tone of shade studied from, and adapted more immediately to, the object to be painted, instead of covering the canvas with one even shade, or half-toned ground, as recently recommended. But however this method may be slightly modified, it is that best adapted to great works. The surface should be cleansed before every painting, and a slight film of vehicle passed over the space to be painted, to secure the intimate adhesion of the super-imposed work. When any portion of the picture is to be finally wrought up with *glazing*, it is better that all the tones should be cooler than ultimately intended ; for, as a general rule, a warm passed over a cool colour produces a better effect than the reverse, for this reason, that the warmer are generally more fluent, and therefore more easily and clearly spread, opaque

colours, on the contrary, have a tendency to mar the transparency of, and to cloud, the under-painting with their solid particles.

What to Avoid.

The use of a stronger drying vehicle as the work proceeds, as it will inevitably contract more than that used beneath, and probably cover the picture with cracks in years to come. For the same reason varnishing is hazardous, more especially at too early a date, before the work is thoroughly dry and hard. As a rule, the strength of the vehicle should be adjusted, so that each successive coat or *painting* should be rather weaker in its drying quality than that immediately beneath. On no account should previous work be painted on without thoroughly cleansing the surface ; otherwise the intimate adhesion of the two will be prevented, and the upper one will be liable to displacement by washing or varnishing. To prevent the *rolling* of colour over paint which has not been cleansed, a lazy practice is sometimes adopted of rubbing the fingers, moistened with saliva, over the work ; this also endangers the displacement of the paint over it, for if the picture be exposed at any time to a thorough washing the moisture will penetrate the oil-paint and soften the thin film of saliva ; and the next passage of the sponge over these endangered portions will

probably remove the paint in flakes. For the same reason the *laying in* of a work with water-colour is to be denounced; it is also open to another objection, for the water-colour, after a time, partially detaches itself from the oil-ground, and, contracting, cracks the oil-paint above. Never indulge in the use of complex and new-fangled vehicles, the simplest, and those which have been longest in use are the best. The same may be said with reference to the choice of pigments. Painting over, instead of completely erasing a piece of condemned work, a practice of careless painters, is to be censured; its injurious effects may require time to develop, but the condemned under-painting will infallibly re-appear, sooner or later, to mar more or less the corrections over it.

It may have been observed that we have in no instance based the theory of the process of oil-painting on what either the old or modern masters may have done. With regard to the methods adopted by the former, there are many speculations. The qualities to be achieved and the means of producing them are the same now as when oil-painting was first introduced; we have preferred, therefore, to analyze these qualities and reduce them to their simplest enumeration and most absolute form, as Transparency and Opacity; and finally to show how these two extreme qualities may be graduated, the one into

the other, in the method we have entitled Impasto.

Oil-Painting upon Distemper Grounds.

One mode of oil-painting which has recently found favour, is that of painting upon distemper grounds. This is even declared to be after the manner of the Venetians. No method can supply the place of intellect, whereas intelligence, having a clear perception of the true ends to be achieved, often produces similar results by slightly different means. The practice in this case is either to commence in oil immediately on the absorbent distemper ground, or to advance the design itself in distemper, and then to tone it by glazing, and heighten it with lights. But distemper, unless used very thin and weak, will crack with bending or rolling, and, as a vehicle, when great delicacy is required it is not so manageable as oil. Its adoption, therefore, would only be justified by the importance of the ends to be achieved. Now, the ground or the underpainting in distemper no longer takes the place of the white ground as a means of reflecting through, and rendering transparent the colour imposed, because oil-paint penetrates the pores of absorbent grounds, deepens and darkens them, but produces a different effect to the same colour used over a non-absorbent white ground. The former produces a sombre, solid, but somewhat

opaque mass of shade, similar to that of woollen textures, and very absorbent of light, but not at all resembling the shades of satin or silken fabrics, velvet excepted. As a method of producing a certain gravity of effect, and of relieving oil-paint from its obnoxious gloss, it deserves consideration. But it must not be forgotten that distemper is absorbent of moisture, and that it loses its tenacity and *perishes* under exposure to damp. Considering, therefore, the position of Venice, this inherent weakness would appear to somewhat invalidate the theory of its being the Venetian method. An absorbent ground may possibly be invented, which shall be unaffected by moisture, and possess all the virtues of a distemper ground without its defects. With the reservations just made, the tempera ground would appear to be that best suited to oil-pictures intended for mural purposes, as being thus executed they are comparatively free from gloss, and are perhaps less liable to blacken than oil-pictures executed with an excess of turpentine. But the painter has to guard, on all occasions, against adopting a process which exclusively aims at one special quality; but he should nevertheless make himself acquainted with any special method of execution, and then his judgment will easily determine when, and within what limits, it may be used. Students who desire to study the history of oil-painting are referred to the late Sir Charles Eastlake's

able and careful work, "Materials Towards a History of Oil-Painting." Other works may be profitably consulted with reference to pigments and varnishes, such as "Field's Chromatography," "Bachoffner's Chemistry of Colour," and "Tingry on Varnishes."

WATER-GLASS.[1]

In 1825, I had an opportunity of publishing a paper on water-glass, which at that time, however, did not meet with the attention which the subject well deserved. It was even stated that it differed in no respect from the well-known "liquor silicum," and consequently, was nothing new. A few voices only were raised in its favour, auguring well for its future. Some experiments on its intended application were made, but abandoned as soon, as they did not lead to satisfactory results, undertaken, as they were, without the necessary knowledge or understanding. Great were the expectations raised by the discovery, greater often than in the nature of things could be realized. Failures, owing perhaps, to faulty manipulation, frequently caused it to be abandoned before it had been put to a fair test. There are always persons to be found, who, themselves unable to carry on experiments, are always ready to condemn those of others upon the faith of a single experiment in which they failed, as I have experienced myself more than once.

[1] On the Manufacture, Properties, and Application of Water-Glass (Soluble Alkaline Silicate); including a Process of Stereochromic Painting. By Dr. J. N. Von Fuchs. Translated from the German. 1859.

An inert love of the customary and habitual almost invariably exerted the usual adverse influence; for it seems to be the fate of anything new to be looked upon with aversion for some time before it is appreciated.

A few years has changed much, and it has been thought since that the water-glass, after all, did not belong to the class of superfluous things, and that few other bodies were capable of being put to so many various applications. I have naturally taken considerable interest, and have had a share in several applications and experiments made with a view of advancing this affair, and was therefore induced to write this pamphlet while life is still spared to me, in order to render the experience gained by myself and others, available for further investigations.

The manufacture and the properties of the water-glass have been described at some length in Kastner's Archiv.[1] I have, however, thought it desirable to reproduce the more essential parts of that paper, since I am able to introduce many improvements, and to treat more amply of things which at that time met only with a short indication.

[1] See Kastner's Archiv for Natural Philosophy of 1825, vol. v., p. 385--412. Separately printed by Leonhard Schrag, of Nüremberg, with the title: On a New Product from Silica and Potash. By Dr. Johann Nep. Fuchs, Professor of Mineralogy.

SECTION I.

Various Kinds of Water-Glass, and their Manufacture.

We have to distinguish four kinds of water-glass: —

a Potash Water-Glass.
b Soda Water-Glass.
c Double Water-Glass.
d Fixing Water-Glass.[1]

At first, and for some time afterwards, my attention was merely directed to potash water-glass,[2] and as nearly all the experiments which I shall have to mention were made with it, I may as well state that potash water-glass is meant whenever the expression water-glass is employed.

[1] The name "Water-Glass" is, in fact, a generic name employed when speaking of the above four varieties. I do not know whether a lithia water-glass might be obtained. Perhaps a good double water-glass of potash and lithia might be produced by replacing a part of the potash by lithia, for which purpose lepidolite could be conveniently employed. This double water-glass would no doubt be rather expensive; cases might, however, occur where expense would be a matter of secondary importance.

[2] M. F. Fikentscher, chemical manufacturer of Zwickau, in Saxony, was the first to manufacture water-glass on a somewhat larger scale, and of the best quality. He would no doubt manufacture soda water-glass also, if required, of an equally good quality, and at a cheap rate.

Manufacture of Potash Water-Glass.

A mixture of—

15 parts of pulverized quartz, or pure quartz sand,
10 „ well purified potash,
1 „ powdered charcoal,

may be conveniently employed.

These ingredients are to be well mixed and exposed to a strong heat in a fire-proof melting-pot for five or six hours, until the whole fuses uniformly and steadily; as much heat is required as is necessary to melt common glass. The melted mass is then taken out by means of an iron spoon, and the melting-pot immediately refilled with a fresh quantity. It is then broken up, pulverized, and dissolved in about five parts of boiling water, by introducing it in small portions into an iron vessel and constantly stirring the liquid, replacing the water as it evaporates, by adding hot water from time to time, and continuing to boil for three or four hours, until the whole is dissolved, a slimy deposit excepted, and until a pellicle begins to form on the surface of the liquid, which indicates that the solution is in a state of great concentration; it disappears, however, when the liquid is stirred, and the boiling may then be continued for a short time, in order to obtain the solution in the proper state of concentration, when it has a specific gravity of from 1·24 to 1·25. In this state it is sufficiently liquid to be used in many operations; in some

instances it will be necessary to dilute it with more or less water. When evaporated to a syrupy consistence, it can be employed with advantage in but few cases.

Very frequently it is found contaminated with a little sulphide of potassium, and it becomes necessary to add a little oxide of copper, or copper scales, towards the end of the boiling, which liberates a small quantity of potash, but which renders it rather more suitable for many practical purposes than otherwise. If it is desirable, however, to have a water-glass which is entirely neutral, it requires to be boiled with freshly precipitated silica as long as any silica is dissolved.

Freshly precipitated or gelatinous silica offers, in fact, the best and most convenient means of ascertaining whether a sample of water-glass is completely saturated with silica by introducing it in small portions into the boiling liquid, when a saturated solution will dissolve no more, whilst an incompletely saturated solution takes up more or less.

Litharge may also be employed instead of oxide of copper, in order to remove the sulphide of potassium, but requires to be added with great care, since an excess causes the water-glass to coagulate.

The solution is allowed to cool, and left to clear in the well-closed iron vessel. The clear

liquid is then decanted off from the deposit (which may serve as a good manure) and filled into stoppered bottles or carboys, and kept for use under the name of potash water-glass.

It may also, for better transport, be evaporated to a gelatinous mass by constantly stirring the liquid, and then packed into tinned iron vessels.

Alcohol furnishes even a more ready means of preparing it in a solid state. By adding one-fourth volume of rectified spirits of wine to a concentrated solution, a gelatinous precipitate is produced, which strongly contracts after a few days, and is deposited on the bottom of the vessel in a solid mass. If the supernatant liquid, which very frequently contains a little carbonate of potash, traces of chloride of potassium, chloride of sodium, and sulphite of potassium, be decanted, and the deposit slightly washed with cold water and squeezed, the water-glass is obtained in a solid and very pure state, and completely saturated with silica. Water dissolves it easily and completely.

Manufacture of Soda Water-Glass.

Soda water-glass is prepared in the same way as potash water-glass; but since soda is capable of saturating more silica than carbonate of potash, it is evident that an equal quantity of quartz requires less carbonate of soda.

A mixture of

45 lbs. of quartz,
23 „ anhydrous carbonate of soda,
3 „ powdered charcoal,

may be employed for a large charge.

The mixture fuses somewhat easier than potash water-glass. Professor Buchner has found that it can be prepared cheaper by means of Glauber's salt, or sulphate of soda, in the proportion of

100 parts of quartz,
60 „ anhydrous sulphate of soda,
15-20 „ charcoal dust.

When the mass is completely saturated with silica, it gives with water a somewhat more opaque liquid than the glass prepared from potash in a like state of concentration.

Rectified alcohol does not precipitate it completely like potash water-glass, merely converting it into a gelatinous mass, and giving no precipitate at all, or only after a short time, when it is not completely saturated with silica, or when slightly diluted. This deportment enables us easily to distinguish it from potash water-glass.

Manufacture of the Double Water-glass.

Potash and soda water-glass are miscible in all proportions. A mixture of equal equivalents of potash or soda, however, must be considered to furnish the normal double water-glass, which is invariably obtained when 100 parts of quartz and

121 of seignette salt are fused together. This method being too expensive for all practical purposes, may be modified by employing equal equivalents of nitrate of potash, nitrate of soda, and the corresponding amount of quartz, which furnish a cheap glass suitable for all technical applications. It may also be prepared by fusing together quartz, carbonate of potash, and carbonate of soda in the following proportions :—

100	parts of	quartz,
28	,,	purified potash,
22	,,	neutral anhydrous carbonate of soda,
6	,,	powdered charcoal.

This mixture is much easier to fuse than any of the previous ones.

A mixture of three measures of concentrated potash water-glass with two measures of concentrated soda water-glass, producing a soluble double water-glass, will be found to answer for all practical applications.

Fixing Water-glass and its Manufacture.

I was for a long time of opinion that the ordinary water-glass, after being completely saturated with silica, forms the best and the most suitable for all purposes. A serious inconvenience, however, showed itself in its application to stereochromy : in the last operation, that of fixing the colours, the pictures assumed a cloudy and dirty appearance in consequence of the rapid partial

decomposition of the water-glass. This drawback caused Herr von Kaulbach and myself much anxiety, and suggested the idea that in this case the water-glass ought not to be completely saturated with silica. A few experiments proved this opinion to be correct; and by adding a portion of soda liquor silicum, or soluble silicate of soda, to the ordinary water-glass, completely saturated with silica, I obtained a water-glass which perfectly answered the purpose. I shall call this mixture *fixing water-glass*.

In order to prepare the soluble silicate of soda (liquor silicum), three parts of pure anhydrous carbonate of soda are fused together with two parts of powdered quartz. It is kept in a rather concentrated solution, and one part by measure added to four or five parts of the concentrated potash water-glass, completely saturated with silica. By this means, silica and an excess of alkali are added, which is sufficient to prevent its rapid decomposition, without perceptibly altering its other properties. The water-glass which was dull or opaque is thereby rendered perfectly clear and a little more soluble. There is no reason why its use should be restricted to stereochromy, and why it should not be employed for various other purposes with great advantage.

Properties of Water-glass, and its Deportment with other Bodies.

It is important to study thoroughly its action upon other bodies, in order to prevent errors, or drawing erroneous conclusions from certain changes or phenomena.

Solid or fused water-glass, if pure, has the appearance of ordinary glass, and dissolves gradually, but completely in boiling water; in the cold, however, the solution proceeds so slowly, that one feels inclined to believe that it is entirely insoluble in cold water. It becomes entirely insoluble only when a much larger quantity of silica has been added and made to combine with it, or when a portion of potash has been withdrawn; frequently, also, when other bodies, viz., earths or oxides of the metals, &c., have been mixed with it, which form double or triple silicates, such as many mineral compounds and common glass itself are composed of, for I have always noticed that silica combines more readily with two bases than with one.

Acids—carbonic acid not even excepted—decompose the solution, and separate silica in a gelatinous form. Solid water-glass is readily acted upon by dilute acids, and silica is separated in the form of a powder.

Salts of the alkalies, especially the alkaline carbonates or chlorides, cause viscous precipitates

from a concentrated solution, and the whole solution seems to coagulate. In dilute solutions, a precipitate appears only after some time—Sal-ammoniac acts most powerfully by producing, even in a very dilute solution of the water-glass, a flaky precipitate, ammonia being simultaneously evolved. On washing this precipitate with water acidulated with nitric acid, pure silica is left on the filter.

The alkaline earths set free more or less potash on being brought into contact with a solution of water-glass, and combine, with the rest of the potash, to form double salts, which are quite insoluble in water.

Alumina combines likewise with it, and forms a product insoluble in water; it is therefore necessary that the quartz which is used in the manufacture of water-glass should not contain any alumina. The insoluble residue which is left behind when the fused mass is dissolved in water, is probably owing to the alumina which the glass has taken up from the glass-pot.

If the water-glass is dissolved and exposed to the air in open vessels, it attracts carbonic acid and suffers decomposition, which causes it to coagulate sooner or later, and produces gradually a slimy deposit, which was found by Professor Buchner to contain potash.

Heat accelerates this decomposition. If the liquid is evaporated and the dry mass made anhydrous by further heating, it swells considerably,

and will then be almost entirely decomposed. Water no longer dissolves it, and acids produce strong effervescence. By calcination it is brought back to its original state, and becomes again completely soluble in water.

It is evident that constant boiling is required to obtain the soluble water-glass in a solid state by means of evaporation, in order to prevent the carbonic acid from penetrating the mass. The same precaution must be observed when fused water-glass has to be dissolved, and care must be taken always to add boiling water in order not to interrupt the ebullition, and thus to allow the access of carbonic acid.

When solid or pulverized water-glass is exposed for some time to the action of the atmosphere, it undergoes the same change as during the evaporation. It effervesces strongly on addition of acids, and is only partly soluble in water, leaving a heavy deposit. On being strongly ignited, this residue becomes again soluble. If a drop is allowed to fall on the table or on the floor, it soon loses its transparency and becomes opaque, owing to a partial decomposition. The same takes place when it is poured from a bottle, and a drop runs down outside the vessel; white streaks, which are difficult to efface, make their appearance. If the liquid glass is kept in a bottle which is only half full and badly stoppered, a white deposit or ring is formed after a short

time, which adheres so firmly that it cannot be removed entirely even by acids, and a more or less heavy deposit is found on the bottom of the vessel, owing to a partial decomposition of the water-glass—a fact which I did not become aware of for some time, on account of insufficient experiments and observations. I have stated in the above-mentioned pamphlet, p. 396, "That the dried and pure water-glass undergoes no palpable change by exposure to the atmosphere, and that it attracts from it neither water nor carbonic acid. A concentrated solution is likewise not perceptibly affected by the atmosphere, although it is decomposed and converted into a stiff jelly by passing a current of carbonic acid through it. A dilute solution becomes turbid on exposure to the air, and is gradually entirely decomposed."

I herewith correct this error.

When concentrated water-glass is brushed upon a solid substance, such as glass, marble, or thick paper, it soon dries up and forms a shining transparent coating, which, however, does not keep long, but becomes gradually dull, opaque, and sometimes fissile and cracked, and of a somewhat pulverulent appearance. This gradual change is caused by water, which the air-dried water-glass retains in rather considerable quantity (about 12 per cent.), and which it loses but slowly, whilst it contracts more and more, and acquires considerable hardness.

One of the most important properties of the water-glass, and one which renders it most suitable for practical purposes, is *its binding and cementing power;* it may be employed for imparting solidity and greater cohesion to loose masses, for joining separate parts of bodies or small particles to form a large hole, for filling up cracks or fissures, &c., and many more applications. Its action resembles that of glue, and it might, in fact, be called a mineral glue.

Its effects are most apparent when it is applied upon solid porous bodies which absorb it, and when it is brought together with pulverulent dust or sand-like bodies, or with substances which can be crumpled up between the fingers, but which are converted into a stone-like mass, from which the water-glass can no longer be dissolved.

The intensity of the effect produced depends upon the nature of the substance with which the water-glass is brought into contact; some possess a stronger affinity than others, and consequently are more powerfully cemented than others. There is, however, this essential difference, that a few, such as magnesia and oxide of zinc, form with the water-glass a chemical compound; whilst others are only mechanically combined, owing to mere adhesive action. The former action, by which bodies are rendered hard and insoluble, will be readily understood, because an insoluble double silicate is formed by the combination with a

second base. The latter is more difficult to explain, especially since the water-glass shows a slightly different deportment with different bodies; and it is therefore not immaterial which body is chosen in order to obtain an intimate solid mass which resists the action of the water. Thus, for instance, water-glass exhibits a much greater power of adhesion for powdered marble than for powdered quartz. It has been shown, moreover, that the carbonic acid of the air promotes the consolidation of the water-glass, because it is partially decomposed when exposed to the air: however, this is not sufficient to explain the striking change which frequently becomes perceptible after the lapse of a few days. Carbonic acid, no doubt, loosens the slight tie which exists between silica and the alkali; but then the former does not remain passive, passing, according to its peculiar nature, through various states of cohesion, becoming itself active, retiring, so to speak, entirely upon itself, and cohering so intimately with the particles of the body with which it is brought into contact, and for which it possesses a strong adhesion, that the whole mass becomes petrified. If, therefore, a body does not readily cement with water-glass, it will only be necessary to add a material which combines chemically with the latter, when the desired end is sure to be obtained.

I call a mixture of pulverulent or sand-like

bodies with water-glass, which cements well, *water-glass cement*. It may be advantageously employed in various cases instead of the common chalk-cement, as will be shown hereafter.

Water-glass imparts considerable hardness to porous bodies, which absorb it, such as vessels of baked clay, plates, bricks, tiles, pottery-ware, &c.; as also to porous limestones, sandstones, and to timber.

It has been stated that water-glass does not cement all solid bodies equally well, and it will be interesting to know which bodies are more or less inclined to combine with it. I will mention only those which are available for practical purposes, and state the experiments which were made to ascertain their deportment.

(*a.*) Carbonate of Lime.

Chalk, Calcareous Sand, Powdered Marble.

When chalk-powder is made into a paste with water, and then well dried and saturated with water-glass, it forms a compact mass. According to Buchner, if a piece of chalk is plunged into a moderately concentrated solution of water-glass and left for about two days in the solution, then taken out, dried, and again put into a somewhat more dilute solution, it is found to be entirely soaked with it, and acquires, on drying, such an even hardness that it is very little inferior to marble, and capable of a good polish. Water

does not soften it, though it assumes a slight alkaline reaction; the chalk is also increased considerably in density. Baron Liebig and Professor Buchner have confirmed this remarkable deportment of water-glass by their own experiments. Chalk, therefore, forms an excellent ingredient in order to render water-glass cohesive and insoluble in water.

The question will be asked, what produces this remarkable change in the otherwise soluble water-glass? Is it in consequence of a chemical process, *i.e.*, does an interchange of the elements of carbonate of lime and water-glass take place, so that on the one hand silicate of lime, and on the other carbonate of potash, are produced?

The change of the water-glass is no doubt of such a kind that Professor Kuhlmann may well be excused for holding the opinion that it is based upon a chemical process. This is not the case, however, as I have already stated in the pamphlet referred to, p. 400:—"Several insoluble salts, such as carbonate and phosphate of lime, which do not possess the power of decomposing the water-glass, have so strong an attraction for it, that when it is evaporated with them it loses its solubility in water, either partially or wholly."

Baron Liebig and Professor Pettenkofer have lately proved beyond all doubt, by numerous carefully conducted experiments, that no chemical interchange of elements takes place, and that not

even a partial decomposition of the water-glass is perceptible.

Is then this extraordinary change merely caused by adhesion? I think that the water-glass and carbonate of lime combine directly, *i.e.*, without a mutual decomposition, forming a weak chemical compound, such as is met with in the mineral known by the name of "cancrinite," which is composed of nepheline (silicate of soda and alumina) and carbonate of lime. A silicate of analogous composition has been discovered by Professor Schafhäutl, in Tyrol, and called by him "didymite."

Cases are known, moreover, of undoubted adhesive action, in little or no way inferior to chemical action. I will only mention iron-flint, which, to all purposes, is a mixture of oxide of iron and quartz, the former adhering, however, so firmly to the latter, that the strongest hydrochloric acid does not dissolve the whole of the iron from a finely powdered ferruginous quartz, even on long-continued boiling, as has been shown by the experiments of Bucholz.

Powdered marble exerts the same action upon water-glass as chalk, and forms a very compact mass with it, especially a very good cement. This cement, which may be prepared of more or less coarsely powdered marble, may find useful application for many practical purposes, as well as the analogous mass of chalk and water-

glass, since it adheres to wood as well as to stone.

(*b.*) Dolomite.

A mineral consisting of carbonate of lime and carbonate of magnesia, which, according to experiments lately made, appears to surpass even limestone in its cementing power, and as it is considerably harder than limestone, a mixture of its powder with water-glass imparts a stronger resisting power against external, mechanical as well as chemical, action. It may be classed with the best means of cementing the water-glass, and to render it insoluble in water, and since it occurs frequently in nature, it may be obtained without incurring any great expenses.

(*c.*) Phosphate of Lime.

Bone-ash.

Phosphate of lime also gives a very compact mass with water-glass, scarcely differing in consistency from that with carbonate of lime, and, as far as has been ascertained, without undergoing any chemical action or change of its constituents. Although it is not likely that phosphate of lime will be much employed, it is interesting to know its deportment with water-glass, because it is sometimes formed by the combination of phosphoric acid and lime, and brought

into contact with water-glass, as will be further illustrated hereafter.

(*d.*) Caustic Lime.

Slaked Lime.

Water-glass sets rapidly when caustic lime is mixed with it, and dries slowly to a rather hard mass. A chemical combination takes place between the lime and water-glass, and potash is liberated, if a sufficient quantity of water-glass be present. It is evident that water has no action upon this product. It may serve advantageously as an admixture to other masses which do not cement so well; only little can be added, however, lest the solution sets and prevents the water-glass from penetrating.

(*e.*) Lime Acted upon by the Atmosphere.

Basic Carbonate of Lime

may conveniently be added to water-glass by rubbing the two substances together: it does not set rapidly, but dries up gradually to a solid mass, which is a chemical product consisting of silicate of potash and lime. Slaked lime forms a useful addition to other masses, since it will soon be converted into carbonate of lime by the action of the carbonic acid of the air, and walls coated with mortar may, after a short time, be impregnated with water-glass in order to cement them better.

(*f.*) Pulverulent Quartz.

Quartz may be powdered as finely as possible without exhibiting any strong adhesive power or inclination to form a cement with the water-glass. If it be made into a kind of cement, and placed upon a tile moistened with water-glass, it dries up to a solid mass after a few days, and resists rain, and becomes as hard as a stone on the surface. But if that surface is pierced, and the inner part examined, it is found quite disintegrated and void of water-glass, the whole of which has been drawn to the surface. Repeated soaking in water-glass is necessary to render the mass homogeneous. A compact mass which leaves scarcely anything to wish for, is, however, obtained when a little dry-slaked lime is mixed with the powdered quartz, and then the mixture treated with water-glass.

The same takes place when water-glass is added to mortar made with quartz, sand, and slaked lime, after the mass has been well dried.

(*g.*) Burnt Clay and Burnt Porcelain Clay.

These two bodies do not belong to those which bind well with water-glass. We observe the same action as with powdered quartz. The water-glass only combines superficially with them, and leaves underneath a porous powder, which will only bind if repeatedly moistened with water-glass.

There exists a remarkable difference between

vessels made of different kinds of clay, which become, as is usual, porous by burning, so that they absorb the water-glass readily. If, for instance, a burnt plate of potter's clay, which possesses no particular hardness, and can easily be broken to pieces, is saturated with moderately concentrated water-glass, and if the soaking is repeated after it has become dry, it is rendered so hard that it resists both chemical and mechanical action which is made to bear upon it. Thus Professor Kaiser prepared a plate of tile-clay about half an inch thick, which was so friable that it would have fallen to pieces under the slightest pressure before being saturated with water-glass, and used it as a covering plate in an evaporating oven; and although vapours of all kinds have been passing over it for the last twelve years, they have not produced the slightest change. It is evident that potter's ware of various kinds can be rendered as durable as a plate of clay, provided they take up the water-glass readily.

(*h.*) Zinc White (Oxide of Zinc) and Magnesia.

These two bodies combine most energetically with the water-glass, and hereby show the same close analogy, which we notice in several others, of their natural as well as artificial chemical compounds.

Oxide of zinc may be ground together with

water-glass without setting too rapidly. If this mass is spread rather thickly upon a slab moistened with water-glass, it contracts slowly, and becomes gradually harder, till it breaks up into many small pieces, which detach themselves from the support. When treated with water, these pieces retain their hardness and are no longer disintegrated ; they impart a weak alkaline reaction to the water. It is evident that oxide of zinc forms an intimate chemical compound with water-glass.

If the mixture of oxide of zinc and water-glass is brushed in a thin layer upon objects, it adheres firmly to them and gives a good coating, to which a colour may be added if desired.

This powerful action of the oxide of zinc makes it a very useful article to add to those substances, which, by themselves, do not bind readily with water-glass. Even to those that do, a small admixture of the salt can be advantageous, and tends to increase the solidity, or, at all events, prevents the water-glass from making its way to the surface.

Pure magnesia also called *magnesia usta*, from the way it is prepared (by igniting pure carbonate of magnesia), when ground together to a paste with concentrated water-glass, sets more rapidly than a mass of oxide of zinc and water-glass, and dries up to a very hard mass, but it is liable to crack and peel off when it is put on a solid body

in a layer a little thicker than card-board. The pieces which peel off exhibit considerable hardness. Water in which they have been boiled has an alkaline reaction, but gives no cloudiness with sal ammoniac, a proof that only a little potash, but no silica, or merely a trace, is dissolved.[1]

I have no doubt that magnesia as well as oxide of zinc combine chemically with water-glass, and that the former may conveniently be employed as an additional ingredient to other masses which possess less binding power.

Experiments have been made with *magnesia alba* as an admixture to water-glass, which have proved perfectly satisfactory. This kind of carbonate of magnesia was made into a paste with concentrated water-glass, and placed upon a glass plate; it soon acquired considerable solidity, and adhered so strongly to the plate that it could only with difficulty be detached by means of a knife. A few pieces were put into water and digested for a short time; it dissolved a little carbonate of potash but no silica, which would have been indicated on the addition of sal ammoniac. The consistency of the mass was not perceptibly altered. A part of it

[1] It is by no means remarkable that a little potash is dissolved on grinding this or a similar mass with water, since it has been found that common glass is slightly soluble in water when ground for some time in an agate mortar, and that when water is boiled for some time in a glass retort, the glass is acted upon, as was first observed by Scheele.

was powdered and boiled with water, when again traces of carbonate of potash only were found to be dissolved. Another portion was treated with dilute sulphuric acid, which gradually produced a slight effervescence, dissolving magnesia and the rest of the potash, and leaving behind silica as a gritty powder, which was perfectly and easily soluble in caustic potash.

Magnesia alba and water-glass, undergo, therefore, a chemical action, by forming a little carbonate of potash, whilst silica, with a part of the potash, combines with the magnesia. Magnesia alba forms, therefore, one of the most important cementing ingredients which can be added to water-glass.

Gypsum.

Hydrated Sulphate of Lime (*Ca. O., S. O.*^{3} + 2 *H.O.*).

When gypsum is ground together with water-glass it solidifies immediately, and on drying, much sulphate of potash or sulphate of soda separates, according as potash water-glass, or soda water-glass has been employed in the experiment. The mass is, however, scarcely more solid than the ordinary gypsum. No doubt, a chemical action has taken place. It follows that objects made of gypsum cannot be impregnated with water-glass in order to render them more solid and capable of resisting the action of the atmosphere, because it does not penetrate into the

pores. Gypsum must therefore be avoided in selecting admixtures for the water-glass; moreover, care must be taken to avoid such bodies as might form gypsum in the operation, or as might already contain gypsum.

Anhydrite, or anhydrous sulphate of lime, and, I think, strongly ignited gypsum, promise a better result; but I am unable to speak so definitively on this point, as the experiments have not yet been brought to a conclusion; and I hope to be able to publish some interesting results with regard to the action of that and other substances upon water-glass, viz., heavy spar, fluor spar, oxide of iron, basic salts of iron, litharge, lead-white, &c.

The state of concentration of the water-glass is a matter of considerable importance in these experiments, and still more so in its practical application.

One part, by measure, of concentrated water-glass to two parts of water, may form the maximum: and one part of the same water-glass to half a part of water, sometimes even less, according to circumstances, the minimum of dilution. If it is too concentrated it does not penetrate those bodies easily and sufficiently which it is desired to impregnate; if it is too diluted and made into a paste with pulverulent bodies, this mass may appear coherent enough when first dried, but will be found more or less friable and loose after a few days, and repeated impregnation with water-glass

only can impart to it the desired solidity. Dilute water-glass interposes too much between the particles of a body, so that numerous small interstices are left, which weaken the cohesive power when the water-glass contracts on drying. All depends upon how far the saturation of such bodies with water-glass is to be carried on,—whether they are to be completely saturated with it, or only to a certain degree. In the first case, we attain the greatest possible solidity; in the second, we gain the advantage that colours or a coating of paint can be put on at any time, and fixed by means of water-glass. It must be left to the operator to modify at will the state of concentration, and to adapt it to his purpose. I will merely state, that a body which has been completely saturated with water-glass can be again rendered porous by warming it, or, what is easier, by burning alcohol once or twice on it.

The pores open a little more in the course of time, especially on exposure to rain, which dissolves part of the alkali, and leaves principally silica, so that at last complete petrifaction takes place, and the desired object is attained.

The question will be asked, Which of the several kinds of water-glass answers best, and is the most suitable for practical purposes? Nothing definite can be stated as yet. It is possible that the potash water-glass, which sets more rapidly than soda water-glass with powdered substances with

which it is mixed, may impart greater solidity to them than soda water-glass; the difference, however, cannot be considerable. On the other hand, the soda water-glass has the advantage of being more liquid, and penetrating more readily into the smallest spaces, pores, and fissures than the slightly gelatinous and difficultly soluble potash water-glass, a property which is of some importance to the sculptor and mason.[1] Soda does not combine so strongly with silica as potash, and has a strong inclination to effloresce when combined with the carbonic acid of the air; and one of the advantages of soda water-glass might be due, therefore, to its parting readily with the silica, and thus accelerating the silicatization of the mass. Further experiments, however, are required to prove its superiority.

The double water-glass seems to unite the properties of the other two, and merits preference for the very reason that it contains two bases (potash and soda) with which silica (which prefers to form double compounds) combines more powerfully.

The fixing water-glass is used for the particular purpose already stated, but it can also be employed in many other cases, especially in painting.

[1] The late sculptor Professor Maier told me that he was enabled to employ a faulty stone in a few days as if it had contained no fissure, by dropping a few drops of soda water-glass into the crevices. He could not employ potash water-glass equally well, since it was not so liquid, and did not penetrate into the fissures.

The first three kinds of water-glass, when completely saturated with silica, are always more or less cloudy or opaque, owing to undissolved and very finely divided silica.

In order to deprive them of this opacity, it is sufficient to add a little liquor silicum, and to allow them to stand for about a day, stirring them occasionally. The opacity disappears completely, and the liquid becomes perfectly clear, provided it be not accidentally coloured by some other (organic) substance.

I have further to remark that, after some time a dust-like efflorescence, sometimes of slightly crystalline appearance, takes place upon bodies which have been impregnated with water-glass. This efflorescence has frightened many and caused the water-glass to be looked upon with suspicion. But this efflorescence is far from being obnoxious, it proves rather that the process of hardening proceeds favourably, by which a little alkali is expelled, thus enabling the silica, which no doubt forms the principal binding element, to act more freely upon the bodies to which the water-glass is applied.

If the efflorescence is removed by means of a wet sponge, it will be found that the solidity of the body thus treated is not only not impaired, but even increased.[1]

[1] This efflorescence is by no means identical with that which frequently occurs on damp walls, and which acts so

I thought at first that this efflorescence consisted of bicarbonate of potash, because it was derived from potash water-glass; but more careful examination by M. Feichtinger, assistant in the chemical laboratory of Professor Pettenkofer, proved it to be carbonate of soda mixed with scarcely a trace of potash. All commercial potash derived from the ashes of plants—and such was the potash employed in the manufacture of this water-glass—contains more or less carbonate of soda, and thus the occurrence of carbonate of soda can be easily accounted for.

destructively by loosening the plastering or cement, or by detaching it altogether, and which is most appropriately called "Mauerfrass." The latter is caused by salts which are contained in the material employed for building walls, most frequently by saline bodies found in the spring water which is used in preparing it. Not unfrequently saltpetre is formed simultaneously. This evil abates only when all the salts present in the mortar have effloresced. Another source of the decay of walls is to be found in the damp or saline soil upon which the walls are built, and from which the wall absorbs the salts unceasingly. A fresh coating of cement, after carefully removing the old, will improve the appearance of the wall, but only in order to furnish fresh material for slow destruction. A coating of water-glass cement, put on after carefully cleaning and impregnating the damaged wall with concentrated water-glass, can alone efficiently stop the destruction for a longer period of time.

SECTION II.

Special Application of the Water-Glass.

The applications which water-glass has found are based upon its properties, as illustrated in Section I. By paying due regard to these properties, no serious difficulties will be met with in its special applications.

One of the most important applications of water-glass is, no doubt, that for painting, based upon its property of causing colours to adhere well, and of imparting to paintings, as well as to coats of paint, great durability and indestructibility. I call this kind of painting *stereochromy* (from στερεὸς, solid, firm, and χρῶμα, colour). It designates that method of painting in which water-glass serves as the connecting medium between the colour and its substratum.

For *monumental painting* it rivals and will eventually supersede fresco-painting. I am told that it has gained considerable ground in Prussia; that fresco-painting has in several cases been abandoned, and that mural paintings which are in course of execution are done by the stereochromic method. In England also this method is reported to receive great encouragement.

The so-called encaustic painting cannot be com-

pared to it.[1] At Munich, the metropolis of German art, it has not met with much favour, although first discovered at that place—perhaps, *because* it was first discovered there.

Before I proceed to the application of water-glass in stereochromic painting, I should like to make a few more preliminary remarks.

I was first induced to investigate the soluble silicates by the many complaints which I heard in regard to fresco-paintings, especially as to their want of stability in our severe climate. I speculated as to whether colours could not be made to adhere better and more firmly upon the walls by means of water-glass, than by means of lime. This led

[1] The paintings excavated at Pompeii were formerly thought to be of an encaustic nature, and various efforts were made to imitate them, but without result, since they were, in fact, real frescoes, as was conclusively shown by Professor Schafhäutl (see "Augsburger Allgem. Zeitung," of January 6 and 7, 1845; "Berlage," p. 42, fol. 49; and Dingler's Polytechnical Journal, vol. xcv., p. 76.)

Nevertheless endeavours have lately been made at Munich to carry out large and expensive paintings in a certain encaustic style. How great a retrograde step in monumental painting was this!

The paintings brought to light at Pompeii cannot be preserved long, but gradually decay. In order to protect them, they have been impregnated with wax and brushed over with sandarac, which deprived them of much of their original beauty. Would it not have been better to impregnate them with water-glass which, no doubt, would render them more durable without depriving them of their freshness? Carbonate of soda, which effloresces, might be wiped off with a wet sponge, after which the painting can be washed with distilled water without fear of injury.

to experiments, which sometimes confirmed, sometimes negatived, the opinion I had conceived of its applicability. Many difficulties had to be overcome. Had I been able to paint myself, it would have saved me much unnecessary labour; for, owing to delays, caused by submitting the various water-glasses to the judgment of others, much valuable time was lost, so that five years were spent over a great number of experiments, expensive, though for the most part unsuccessful, until I arrived at the desired end by the aid of Herr von Kaulbach's unceasing co-operation, and the lively interest shown by him in the new discovery.

It appears strange, indeed, that so much time and labour should have been occupied upon a discovery which in reality is so very simple, as will be seen from the following description:—

It was found in the course of this investigation that stereochromy can be employed upon other substrata as well as upon walls, and that even easel-pictures of moderate size can be advantageously executed; moreover, that stereochromic paintings and coatings of paint may be put upon certain grounds directly, *i. e.*, without a substratum of cement.

Mural or Monumental Painting upon a Ground of Mortar-Cement.

To produce a stereochromic picture of great beauty and permanence upon a wall, it is chiefly

necessary to look to the *foundation* of the picture, which consists of a *lower* and an *upper* layer of mortar-cement. Errors which are committed in their preparation throw obstacles in the way of the painter, and injure the beauty of the painting. The principal and most important operation in forming the ground-work consists in imparting to the mortar-cement a thorough and stone-like solidity, and a perfect adhesion to the wall, at the same time rendering it capable of absorbing the water-glass in all its parts with equal avidity. The first layer or substratum is formed of ordinary lime-mortar; its object is to equalize the unevenness in the wall, and to cover well the stone. The sand ought to be of medium grain, neither too coarse nor too fine, and it may be either calcareous or quartz sand. It is, however, necessary to wash either kind well before using it. The lime must be properly slaked and sparingly employed, so as to render the cement—which must be made up with distilled or rain-water—rather poor than otherwise. A rich cement would not absorb the water-glass readily, and will sometimes cause it to crack.

The plaster covering thus prepared requires to be well dried and exposed to the air for several days, in order that it may absorb carbonic acid and be converted into basic carbonate of lime; for, if the lime in this cement be perfectly caustic, the water-glass would subsequently be

decomposed by it, and could not penetrate to the wall—a matter of necessity if a good cementation is to be effected.

The saturation of the lime with carbonic acid may be accelerated by moistening the wall several times with a solution of carbonate of ammonia. When it is dry, and the ammonia evaporated, water-glass may be employed to make it adhere to the wall. The application is repeated several times, allowing the surface to dry each time, and continued almost to the point of complete saturation. The water-glass used must be either the soda or the double water-glass, treated with as much liquor silicum as to render it perfectly clear.

Soda and double water-glass are preferable to potash water-glass, because they are absorbed more easily. They ought not to be used in a concentrated state, but diluted with equal parts of water, in order to insure their penetrating to the wall. The thickness of the plaster will be different in different places, owing to unevenness in the wall; and since a thick layer requires more water-glass than a thin one, the latter will be saturated long before the other is, and it will be necessary to treat the thicker parts of the substratum separately with water-glass so long as it is absorbed, in order to render all parts equal.

When the lower ground has been thus pre-

pared, the upper layer, which is to receive the picture, may be added soon after. To the careful preparation of this layer, I repeat it, the certainty of success and the facility of the execution are mainly due.

The thickness of this upper layer is about one-tenth of an inch. In its composition it does not essentially differ from the lower one, and consists of lime-mortar, which ought to be made with distilled or rain-water and well-washed sand (calcareous or quartz sand), of a grain which does not exceed a certain size, and with not too much lime to prevent cracks and insure complete absorption. It is better to run the sand through a sieve, in order to obtain the right grain.

I am of opinion that artificially prepared calcareous sand, *i. e.*, sand obtained by grinding marble or dolomite, is preferable to the natural sand, because the latter consists of round, smooth little grains, which do not set so well as the sharp-edged fresh grains of artificial sand. Very fine powder, on the other hand, which would set still better, is to be avoided, and should be removed by decantation, or by means of a fine sieve, because it renders the mass too compact and less absorbing.

The condition of the surface of the ground for painting is chiefly dependent upon the size of the grains of sand ; the coarser the grain the rougher the ground. This is to a certain degree rather

advantageous than otherwise in painting, provided that water-colours adhere sufficiently until the water-glass be added. The surface ought to feel to the touch like a rasp, as Kaulbach expresses it. A difference must also be made according as the pictures are to be viewed at a great or short distance; in the first case, the sand used may be much coarser than in the second.

When this coat of mortar has become dry, it is sometimes rubbed over with a sharp sandstone or iron straight-edge, in order to remove the thin layer of carbonate of lime which has been formed during the process of drying, and which would prevent the water-glass from being absorbed, and also to impart the required roughness to the surface.

I cannot, however, approve of this method, and I think it far better to destroy the calcareous incrustation by means of a simple chemical reaction, viz., by dilute phosphoric acid (1 part of concentrated acid to 6 parts of water). The acid is brushed over the surface by means of a sponge or brush. Phosphate of lime is formed, which binds well with the water-glass, so that the plaster does not suffer in the least; whereas, if mechanical friction is resorted to, there is a risk of detaching small pieces, and leaving small cavities, which have to be filled in again.

When the ground has been thus prepared and well dried, it is impregnated with water-glass, in

order to give it sufficient consistency and to cement it well together with the substratum. It is advantageous to employ for this purpose double water-glass, clarified with liquor silicum, and diluted with its equal bulk of water. It will be found sufficient to repeat the operation twice, after allowing some time for drying. Too much water-glass would only tend to close up the pores, which would throw considerable obstacles in the way of the painter. If too much should have been used, either the whole layer of plaster must be removed or the oversight may be made good by waiting some time, till the further contraction of the water-glass renders the ground again sufficiently porous, or by applying heat, which is best done by burning alcohol on it.

After the upper ground has been thus prepared, either by rubbing or by the action of phosphoric acid, and cemented with double water-glass to which a little liquor silicum has been added, in such a manner that the water-glass is equally spread over the whole surface, exhibiting a good and even absorption everywhere, painting *may be*, but *need not be* immediately proceeded with. Delay will only increase the capacity of absorption which the ground already possesses.

The artist has to observe no further precautions, and the necessary practice will soon be acquired by painting a few easel-pieces on such ground.

Artists who should, nevertheless, doubt the efficiency of the water-glass, and who should hesitate to undertake a larger work, will meet with the best advice at the hands of Herr von Kaulbach and M. Echter, who, I am sure, will be pleased to give the desired explanations and assistance.

The colours are ground with pure water, and used by the artist upon the prepared surface, taking care to moisten the wall frequently with pure water in order to displace the air from the pores and to insure more completely the adherence of the colours. This syringing with water must be done with moderation, and only as often as is necessary. Great care must be taken not to wet too much those parts which have been painted over, because, as M. Echter observed, the colours are liable to lose their freshness; it appears that the water washes the finest and least powerful particles of the colours up to the surface. This inconvenience is greatest in places which have to be painted over repeatedly, and have to be moistened each time. M. Echter, however, has found a remedy. He brushes away these fine particles of colour, after they have got dry and before the picture is fixed, with a very fine brush, and he thus restores the picture to its original freshness.

Nothing more remains now but to fix the colours properly, to which end the fixing water-

glass is more specially employed. It suffices to dilute it with half its volume of water.

The colours which adhere but slightly do not allow of the brush being used, and it is necessary to besprinkle the painting with water-glass, in the form of a fine shower or mist, at first very carefully, so as not to displace the colours or to cause them to run one into another. Professor Schlotthauer, who has bestowed much time and labour upon stereochromic experiments, has invented a syringe for this purpose, which leaves nothing to be desired, and for which stereochromy is much indebted. The operation of alternate besprinkling and drying is continued until the colours adhere so firmly that they cannot be rubbed off with the finger. If white pocket handkerchiefs, which are sometimes employed as tests, be smudged, it does not prove that the colours are not possessed of the desired durability; because rubbing with great force loosens grains of sand, the friction of which detaches parts of the colour that indirectly smudges the pocket handkerchief. The same is experienced in fresco-painting.

Experiments made with regard to the durability and solidity of colours have shown that, whilst some are sufficiently fixed, others are more or less loose, and soil the finger. This refers more especially to the so-called meagre colours, like black. These require more water-glass, which is added by means of a fine brush. Baron Kaulbach told me,

however, a short time ago, that this occurs now but very rarely, since it can easily be guarded against by properly mixing the colours.

This is a general outline of the method by which Director von Kaulbach, assisted by the excellent painter M. Echter, has executed four large stereochromic paintings in the new museum at Berlin; and they all, especially the last, meet with unqualified approbation among all impartial artists and lovers of the art as to the increased perfection in the technical execution; and they are generally acknowledged to be a real advance in the art of monumental painting.

Before proceeding further, I have to make a few additional remarks.

It was soon found that water-glass could not be employed in stereochromy as oil in oil-painting, *i.e.*, the colours could not be ground with water-glass before applying them. A very dilute solution even rendered the brushes soon stiff, and caused the colours to harden on the palette. It remains to be seen, however, whether water-glass is to be rejected in all cases as an admixture to colours. There is now doubt that such a mixture cannot be dispensed with when damaged pictures have to be renovated, or when pictures which have been fixed are to be painted over in some parts in order to restore harmony between these and the other portions of the picture. I am therefore of opinion that it may render good service in painting, as an

addition to many colours, especially to the meagre ones. I am not speaking now of the usual potash water-glass, which is inapplicable, but of that which has had liquor silicum and water added to it, and which is used for the fixing of pictures.

When the brush begins to become somewhat stiff, it has only to be put into pure water, and after a short time it will again be found fit for use, whilst another may be employed in the mean time.

The brush must not be left exposed to the air before washing it, or else it would become quite stiff, and could no longer be softened in water.

The hardening of the colours on the palette may easily be prevented by adding from time to time a drop of water by means of a dropping-glass. It is well not to put too much colour upon the palette.

These must be considered as a few hints only, upon this subject; the trial of its applicability, however, must be left entirely to the artist.

I might mention here that Kaulbach executed the first picture by means of dilute water-glass, to which I had added a little caustic potash, upon a broad tile covered with a layer of plaster prepared with powdered marble, which served him as a ground for painting upon. The trial succeeded so well, that he felt at once strongly in favour of the new method of painting. This little picture exists still, and is well preserved, although it has been much knocked about. A second and larger picture,

similarly executed and well finished, was destroyed by an accident. Soon after, he expressed a wish to obtain a more tractable admixture to his colours than mere water, and I gave him a paste-like mass, such as is obtained by precipitating a dilute solution of alum with water-glass, and adding a little of the well-washed precipitate to the colours. A few trials were made, which, for the most part, succeeded well—some very well. But this also was not found to answer sufficiently. He thought it too tedious and inconvenient, and he convinced himself that no admixture is required when the grounds are rough, and that the colours adhere sufficiently well with water alone.

Formerly, when potash water-glass was used for fixing the colours, it was often found to dry unevenly and to give a dirty appearance to the pictures, particularly when more water-glass was used than was absolutely necessary for the fixation. The "fixing water-glass" above described has the advantage of allowing more freedom to the operator without any risk of staining the picture. An excess will only help to make the plaster coat more durable. Should the surface be so much saturated with water-glass that an additional layer remains unabsorbed for a whole minute, it is better to blot off the excess with blotting-paper, as it might dry into greyish-white spots; but even these have been known to disappear spontaneously after a little time.

The painting is finished when the colours are fixed. It is well to wash the picture with spirits of wine after the lapse of a few days, in order to remove any dirt or dust, as well as a little alkali, which is set free; and at the end of a few more days it may be washed with pure water, without any risk of damage to the colours or fear of injury from exposure to the rain. Spring-water, which is apt to deposit carbonate of lime, must not be used for washing.

If a painting is to be executed on the outside of a building, care must be taken not to expose it to a heavy rain before the colours are fixed, because an hour's exposure might destroy what required weeks to execute.

The finished picture, especially when it is exposed to the open air, ought to be carefully examined in the course of a few months or a year, to ascertain whether it has acquired any power of absorption. If so, it is evident that more fixing water-glass is required to fill up the pores caused by the gradual contraction of the original layer of water-glass. Although a second fixing operation is not absolutely necessary, it will improve the picture; for the more silica can be added to a stereochromic painting, the firmer and more durable will it become. My advice is, therefore, not to neglect the *after fixing* of these paintings, especially of those on the outside of buildings, wherever it is feasible.

In the preceding lines I have spoken of the preparation which a fresh wall requires in order to render it fit for receiving a stereochromic painting, and I have now to answer the inquiry, which has frequently been addressed to me, whether old walls which are already covered with a layer of plaster can be used for stereochromic painting; to which question I can only give a conditionally affirmative reply. If the plaster has been rubbed with a rough sandstone and well smoothed, and if it then absorbs the colours well and is well cemented to the stones of the wall, thoroughly dry and free from efflorescent salts; or if, as is said in common parlance, the wall is quite sound; there is no reason why it should not be used for painting with success, after it has been duly impregnated with water-glass. This is shown by the experiments which I made with Director von Zimmermann and the late Professor Krötz.

Our wish of trying the execution of a stereochromic painting on the outside of an old building, on a wall which was much exposed to the action of the atmosphere, was met half way by M. Himbsel, who desired to have two images of saints executed at his country-house on the Lake of Starnberg, built about twenty years previously. The walls were found sound, the plaster firmly adhering to the stones (of which we convinced ourselves by striking the wall with a small ham-

mer), and at the same time so little porous that it did not exhibit sufficient power of absorption, even after rubbing it with a very rough sandstone. We employed, therefore, phosphoric acid diluted with ten parts of water, which was brushed twice over the wall. When dry, the wall was not very absorbing, yet sufficiently so to enable Von Zimmermann to begin his paintings without delay. The two pictures were executed without any difficulty, and satisfactorily fixed. The fixing was repeated after the lapse of a year. They are now five years old, and have remained quite intact ever since. I shall have to speak once more of these pictures.

The success which accompanied the first experiment naturally led to the idea that perhaps fresco-paintings could be converted into stereochromic paintings by a judicious use of water-glass, and thus rendered equally solid. I leave it undecided for the present whether this could be done successfully, as I have not had an opportunity of trying experiments, although it must appear highly desirable to discover means of protecting fresco-paintings, which are still being executed in spite of the discovery of stereochromy.

For want of experience, I can only give my opinion as to what might be the best method of procedure.

The picture would first have to be washed with rain-water, slightly acidulated with pure vinegar, by way of besprinkling, in order to remove dust

and dirt; principally, however, in order to remove the thin coating of carbonate of lime which has formed upon the surface, covering the colours, and preventing the absorption of the water-glass. The besprinkling is repeated with pure water in order to remove the acetate of lime which has formed, and which would interfere with the subsequent action of the water-glass. Stronger acid would discolour the ultramarine, and turn the chrome-red to chrome-yellow, and must therefore be avoided. Careful manipulation is required even with the dilute acetic acid; and slight brushing with a sponge, soaked in the dilute acid, might sometimes conveniently be substituted for the sprinkling; the acid must altogether be employed very sparingly, as the evolution of carbonic acid gas might otherwise loosen the colours, and detach them from their underground. Nothing remains now to be done but to saturate the dry picture with fixing water-glass.

Our climate is, as is well known, not very favourable to fresco-painting. We have a proof of this in the deplorable state of a large and fine picture on the Isar gate at Munich, representing the entrance of the Emperor Lewis, the Bavarian, after the battle of Ampfing, which was painted nearly twenty years ago, and which has already suffered so much that it is likely to be destroyed before long if it is not protected. And yet this picture is placed in a rather favourable situation,

being painted on the east side of the gate, therefore not much exposed to bad weather, and sufficiently elevated to be protected from the moisture and saline matter of the soil.

And is there no guarding against the destruction of this work of art?

It is important to ascertain how far the decay has been allowed to go on: whether it is merely superficial, or whether it goes to the very depth; whether fissures or cracks exist, and whether parts of the plaster have become detached. It must be left to the judgment of the renovator as to what course ought to be pursued with regard to the injured painting.

I can only say so much, that I know of no other remedy but the water-glass and the water-glass mortar; the first to fix the colours and the ground, the latter to fill up cracks and cavities, which then have to be painted over again by the artist. Although the picture may not be restored to its original perfection, it would, nevertheless, be protected from further decay, and saved from final destruction.

Stereochromy is but a child of late birth, and has yet to struggle for its existence, and it must not be supposed that it has already reached the highest degree of perfection. Once taken up by others, it will no doubt be improved, and promises many advantages which may have been overlooked.

The chief attention must be directed to the upper layer of plaster or the painting-ground; in this, errors are easily committed, and have frequently been the source of failures.

I have, therefore, endeavoured to obtain a still better and surer method for preparing the painting-ground, and I think I have succeeded in obtaining one which answers in every respect. I propose to prepare the upper coat of nothing but *water-glass cement*, *i.e.*, a mortar in which the lime is replaced by water-glass. The sand to be mixed with it may either be powdered marble or dolomite, or quartz sand mixed with a little dry slaked lime. [The addition of a little lime or white of zinc may also be of advantage when marble or dolomite are used, as it ensures a more perfect and powerful combination with the water-glass.] The mixture must be very intimately made. As to the proper proportions, it suffices to state that so much water-glass should be added as to give to the mass the consistency of ordinary mortar.

This cement is laid on equally thick over the first plaster coat, properly smoothed and allowed to dry. It possess many considerable advantages over the lime-mortar, which is *subsequently* to be impregnated with water-glass. Its preparation is simple, and every experienced mason will easily render himself master of it; mistakes can scarcely be made, as the material, once decided upon,

remains always the same. The water-glass is equally spread through the whole mass, so as to ensure equal cementation and silicatization, which can scarcely be obtained when the water-glass is added at a later stage. During the repeated moistening of the picture no lime will be drawn to the surface and disturb the colours, because no soluble lime is left in the mass; moreover, no encrustration of carbonate of lime will ever form, and no rubbing with a stone will be required to render the surface absorbent. Lastly, the water-glass is here in immediate contact with the lower substratum and ensures perfect adhesion to the wall, whereas the other method always leaves it uncertain whether the water-glass will penetrate the upper layer entirely and evenly.

This cement, when dry, becomes as hard as stone. At first, it exhibits little or no power of absorption, which is easily accounted for, because all the pores are filled up with water-glass. It acquires, however, this property in a satisfactory degree by exposure to the air for a few days, especially when the air is warm and dry, but loses considerably in solidity by the contraction of the water-glass, and it becomes necessary to saturate it once or twice with water-glass diluted with half its volume of water, in order to impart to it the proper consistency. This must be done cautiously, so as not to stop up the pores by employing too much water-glass, which would

obstruct the painting considerably. [The burning of spirits of wine on the surface would, no doubt, remedy the evil.]

If carbonate of soda effloresces on the surface, it is a sign that the plaster has set well. The efflorescence can easily be removed by means of a wet sponge, and the ground will then be found harder than before. Painting may now be proceeded with in the usual way.

M. Echter is at present engaged upon executing an easel-piece on a layer of water-glass cement, and the work promises well. He uses a plate of burnt potter's clay, three feet four inches high and three feet wide and half an inch thick. After saturating the plate with water-glass, a painting-ground of one-tenth of an inch in thickness, consisting of water-glass cement, was laid on and well smoothed. Painting upon this ground proceeds so well that M. Echter assures me he could not wish for a better one.

The water-glass cement employed for this plate was made of pulverized dolomite (from which the finest powder had been removed by means of a fine sieve) and a little dry slaked lime, to which water-glass was added so as to produce a mass of the usual plaster consistency. When dry, the plate was once more thoroughly impregnated with water-glass, diluted with its own volume of water, &c.[1]

[1] This picture has since been successfully finished, and is now in the possession of the King of Bavaria, and may be

Hydraulic lime has also been recommended as a suitable substratum for painting, because with a little water-glass, it forms a mass of considerable hardness and great absorbing power, in which the lime sets sooner than in the hydraulic cement. According to the experiments of M. Feichtinger, one part of solid water-glass is sufficient for fifteen parts of hydraulic lime; a larger amount would be rather injurious than otherwise. But since water-glass cement responds to every application to which it can possibly be put, and since we have it in our power to prepare it most successfully, I have abstained from experimenting further upon the hydraulic lime, especially as it seems to be difficult to obtain it of uniform composition, and the result will therefore always be doubtful. In my pamphlet, on "Chalk and Cements," I have already mentioned the service which water-glass is capable of rendering to hydraulic cements.[1]

seen on a wall in the Royal Winter Garden. The artist has chosen for his subject the Madonna della Sedia, by Raffael.

[1] In page 49 of that pamphlet I said—"A very good method of protecting this or any other hydraulic cement from decay, and imparting to it considerable hardness, consists in the application of water-glass solution after the cement has slightly contracted. When the water-glass has been brushed over its surface, water has no longer any effect upon it. It becomes coated with a hard crust, behind which the lime and the cement quietly continue their mutual action. Small pieces put into a very dilute solution of water-glass became in two or three days so hard that they could no longer be scratched with the finger-nail. The liquid, generally rendered cloudy by dissolved lime, remained perfectly clear. A method so inexpensive might, therefore, find more frequent application."

It has already been stated that stereochromy may be applied to a variety of subtrata, and that even stereochromic easel-pictures can be successfully executed. When moderately burnt, so as to ensure good absorption, plates of clay, vessels of potter's clay, stoves of clay, &c., after being sufficiently saturated with water-glass, can be painted upon directly or indirectly. It will, however, be well to give them first a slight coating of water-glass cement, which ensures more readily a flat and equally coarse surface, suitable for painting. Easel-pieces of considerable size may be painted upon plates of clay. The only limit to their size is the difficulty of managing plates of great weight. The plates should not be thicker than three-fourths of an inch and not too much burned, so that they may absorb well. Their surface should be flat, but not smooth. Frequent saturation with double water-glass, diluted with half its volume of water, imparts to them a solidity such as strong burning could not do. Should they lose their absorbing power by the addition of too much water-glass, they have only to be warmed for some time, *e. g.*, by burning spirits of wine on them.

If it is required immediately to paint upon such a ground, it is well to add a little fixing water-glass to the colours, especially to the meagre ones. The further treatment is self-evident. Objects made of burnt clay, such as figures, ornaments,

vases, goblets, &c., can likewise be painted, and would gain considerably in beauty and durability. Attention would, however, have to be paid to the quality of clay which is used for such vessels.

I would draw attention to an application which might be made of water-glass, viz., to impart to our stoves, which are generally made of burnt clay (Dutch tiles), a more agreeable appearance, thus offering to art a means of embellishing our rooms and awaking the sense for the beautiful.

In order to convince myself of its feasibility, I had a tile taken out of the stove of my laboratory, and a new one of the same clay put in, which was first sufficiently saturated with water-glass, and then painted with band-like streaks of various colours mixed with a little water-glass, and finally fixed.

After the stove had been heated several times, the colours began to loosen, and they had again to be fixed, and this fixing process had to be repeated several times.

It is evident that heat increases the contraction of the water-glass, and I should have done better by saturating the tile repeatedly with water-glass and heating it, in order to impart to it the greatest possible quantity of water-glass; and I would advise complete saturation in any fresh experiment which may be made. The colours stood very well for two winters, in spite of being daily exposed to a strong heat, and they adhered so firmly that

they could only be detached with great difficulty. The stoker, however, made an end to all further observations by accidentally breaking the tile in pieces, upon which the colours are still preserved undimmed.

Herr von Dyk, Director of the Telegraph Office at Munich, has shown that cast iron may successfully be painted stereochromically.

At the instance of Professor Pettenkofer, he ordered the cast-iron stoves in his offices to be painted on the flat parts with so-called caput mortuum, and on the raised parts, such as frames and decorations, with zinc-white. The paint has stood well up to the present time. Herr von Dyk made the interesting observation, that if the colour is applied while the iron is cold, it falls off when the stove is heated, but that it adheres well if applied while the iron feels warm to the touch.

The cause of this difference lies, no doubt, in the pores of the iron being somewhat more open at a slightly raised temperature, the air being slightly rarefied or partly displaced, so that the water-glass penetrates better.

This leads me to draw particular attention to the temperature at which the fixing of the painting-ground and of the stereochromic picture is performed, especially to the temperature which the water-glass itself possesses.

It is very important that the water-glass should soak in evenly and deeply, in order to ensure

everywhere equal and strong cementation. For this reason the water-glass ought to be diluted with water. Like other fluids, it is rendered much more liquid when heated—say to between 100° and 120°, and penetrates therefore more readily into any porous mass, by displacing more easily the air than it would do at the common temperature. Heat produces in this instance the same effect as dilution could produce at the common temperature, and renders it much more suitable for fixing colours upon porous objects. This action of the heat will be the more perceptible if the objects themselves, as well as the water-glass, are slightly heated, so that, with care and attention, a solidity and durability may be obtained, such as mosaic works only possess.

If a syringe be employed for fixing the water-glass, it is most conveniently warmed by plunging it into warm water. Mural surfaces which have to be fixed with water-glass are best heated by burning alcohol on them, which process, however, can only be resorted to when the colours, which adhere but loosely, have once been fixed with water-glass in the usual way.

The rooms in which the fixing process has to be carried on ought evidently to be kept warm during this operation.

Plates of *lithographic limestone* may likewise be used as a ground for stereochromic pictures; the first trials in stereochromic painting were, in fact,

confined to such stones. They require, however, to be coated with a thin layer of water-glass cement mixed with somewhat coarse sand, in order to ensure the adhesion of the painting-ground. When the cement is quite dry, the upper coat is put on, and painting may be proceeded with.

If the lithographic stone is treated with phosphoric acid, it takes the colours well which are mixed with water-glass; it is therefore probable that in that state they may serve for stereochromic painting without any further preparation.

There is no doubt that plates of clay-slate can be painted upon stereochromically, after having received the proper preparation. This material has the advantage over clay or limestone plates, that it is less brittle, and need not, therefore, be so thick. I have as yet made no experiment with it.[1] Porous sandstone and porous limestone, when well saturated with water-glass, must likewise furnish a good ground for stereochromic painting either directly or indirectly; there is at least no reason why they should not.

No stereochromic painting has as yet been directly executed upon *wood*. The water-glass, mixed with colours, has, however, been successfully employed for staining wood. When wood

[1] Paintings upon stone plates can be placed in walls in such a manner as to make them appear to form part of the wall. Once well fitted in, they are ensured against all accidents, and yet may easily be removed when a change of residence becomes necessary.

has been properly saturated with water-glass, the water-glass cement adheres well to it, and upon a thin layer of this cement a picture might of course be executed. In many instances this method may prove very useful.

It remains doubtful at present whether a transparent stereochromic painting can be executed upon glass. There is, however, no difficulty to paint indirectly upon glass, if ever it should be thought advantageous, since water-glass cement, upon which the painting would have to be done, binds exceedingly well with glass.

It would be very desirable to employ such a light and flexible material as *canvas* as a ground for stereochromic painting, because easel-pictures of some extent, such as altar-pieces, could then readily be painted. Several experiments have been made which have not yet led to satisfactory results ; they are, however, being continued.

I have to make a few more remarks with regard to the colours which may be employed in stereochromy. Their number is so great that the new kind of painting is not restricted in their use.

M. Ch. Buchner, manufacturer of chemical products at Munich (Karlstrasse, No. 40), constantly keeps a complete assortment of them in store. They are :—

1. Munich white.
2. Munich black.
3. Munich brown.
4. Chrome green.
5. Cobalt green, light and dark.

6. Chrome red.
7. Oxide of iron, bright red, reddish brown, violet, and brown.
8. Cadmium yellow, light and dark.
9. Chrome yellow.
10. Ultramarine.
11. Dark ochre, the same burnt.
12. Flesh ochre.
13. Gold ochre, ditto burnt.
14. Terra di Siena.
15. Umber, ditto burnt.

No organic colour, such as lake, is admissible, because it will sooner or later be found to fade. Vermilion must also be rejected, because, when exposed to the light, it darkens, and ultimately turns black.

The colours ought to be ground as finely as possible, because they are rendered thereby more manageable and more adhesive. Chrome red alone forms an exception, because long-continued grinding turns it yellow.

Cobalt blue shows a brighter blue after fixing, and light ochre becomes darker. These two colours cannot, therefore, be recommended for this kind of painting.

It must be remarked that the fixing process produces slight changes in *all* the colours of the painting, which appears afterwards of a somewhat darker or more sombre hue ; but after some time this effect disappears again.

The colours ought to be as pure as possible ; they ought especially not to contain anything which reacts upon the water-glass and produces a decomposition, or causes it to coagulate, such as gypsum or sulphuric acid, which are frequently

met with in red oxide of iron (kolkothar caput mortuum), and in yellow ochre.

I cannot close this article without saying a few words with regard to the peculiarities, the convenience and advantage which this method of painting promises in comparison with fresco-painting and the so-called *encaustic*.

Its peculiarity consists in an entirely new vehicle, differing from those employed in every other method of painting, so that stereochromy must be looked upon *as quite a new method of painting*. The excellence of this method depends on the substratum of the picture, which enables it to resist the action of every climate, as well as the destructive influences of smoke, acid vapours, quick changes of temperature, hail, &c., which would destroy frescoes. I have, therefore, called it *stereochromy*.

The new vehicle holds the painting-ground and the colours, as it were, fused together, silicated or petrified, forming the material distinction of this kind of painting, and rendering it far superior to fresco-painting with its ordinary ground of lime-mortar.

The durability of fresco-paintings depends chiefly upon this mortar, even more than upon the skill of the painter, who is usually blamed when his work does not succeed, or lasts only a short time. The ruin of a fresco-painting is, in my opinion, always caused by errors committed in the preparation of the mortar; the only error almost

which the painter can commit is the choice of colours which fade, or become discoloured in the course of time. Cornelius, when executing the frescoes in the Glyptothek, at Munich, met with several difficulties of this kind, and he was accused of not understanding fresco-painting. When I was called upon to report upon the case, I found that the plaster was rotten, and contained much sulphate of magnesia or bitter salt. I ordered this ground to be entirely removed, and to be replaced by a new one, prepared with washed sand and distilled water. No further complaint was made, and the paintings have stood very well. Much depends, also, upon the lime used in the mortar. If slaked and kept moist for some time, it answers better than freshly slaked lime; if poor it acts better than rich; lime containing magnesia, oxide of iron, or manganese, is better than pure lime.[1]

Encaustic painting has two enemies; the mortar ground and the organic materials used for painting, which are subjected to the natural laws of decay and decomposition.

In more southern countries, as in Italy, fresco-paintings withstand, no doubt, longer the ravages of time than in northern climates; they are, however, not quite exempt from destruction, as is proved by Raffael's frescoes in the Loggie of the

[1] The preceding remarks are very important to fresco-painters.—W. C. T.

Vatican, which are said to have suffered considerably; and it has been found necessary to take precautions to prevent the further spreading of the destructive action.

In order to test the advantages of stereochromy, proof-plates were submitted to the roughest treatment; they were exposed for weeks to rain and frost; the ice which had formed upon them was allowed to thaw in a warm room, and this freezing and thawing process was repeated without in the slightest degree damaging the plates, whilst fresco-paintings treated in the same manner became quite friable, and crumbled to pieces.

A small stereochromic picture was exposed on the roof of the Royal Museum at Berlin, near the chimney, to the action of wet and cold, smoke and soot, for a whole severe winter. When taken down in spring, it certainly looked as if it had been completely spoiled; but, upon being washed with spirits of wine, it was found to be as fresh as it ever had been. A small picture (two peacocks) on the west side of Herr von Kaulbach's atelier, close to the ground, has been preserved well, although the wall is thoroughly damp, and covered with shrubs in summer. It deserves to be noticed, that the damp and the efflorescence of the wall, during this rather long period of time, had scarcely any damaging effect upon the picture.

A further proof of the durability of stereochromic paintings will be found in the two pic-

tures of the country house of M. Himbsel, on the Lake of Starnberg, to which I have already referred. They are now six years old, and are still as fresh and unchanged as if they had just come from the hand of the artist, in spite of storm and weather, which often sweeps from the west over the lake close by, and dashes the rain upon the walls with such force that it runs down in streams, forming sometimes crusts of ice in winter.

Stereochromy offers considerable advantages to the artist; painting is quite in his power, as well as the material, whilst fresco-painting makes him a slave of the latter. He is able to interrupt his work and continue it again after a shorter or longer time; he can retouch his painting before fixing it as often as he thinks it desirable. The finest colouring, the slightest touch of light and shade, the harmony of colours, and, consequently, the greatest perfection of a painting are in his power.

Stereochromy possesses that advantage which fresco-painting also has over oil-painting, that the colours are not shining, and that the observer can get a full view of a picture in whatever position he may be.

I have given a description of the principles upon which stereochromy is based, and I cannot help remarking, in conclusion, that this one investigation has cost me more time and labour.

together with considerable outlays and expenses, than most of my other investigations put together. Several of my friends could testify to the same; many of them assisted me materially in my difficulties, and I offer them my deep-felt gratitude at the conclusion of my labours. But, before all, I thank God, who graciously allowed His weak and aged servant to finish the preceding investigation of the water-glass, and its application, so far that others may build upon the foundation I have laid.

To the Giver of all good be thanks for all joys and sufferings experienced! May His blessing be upon the work!

Omnia ad majorem Dei honorem et gloriam!

Munich, Nov. 20th, 1855.

[A continuation of the various other applications of the water-glass will soon follow.] [1]

[1] Death has put an end to the labours of the learned philosopher, and the reader will not see the promised continuation. Fuchs had a presentiment of his approaching death when he wrote the above concluding lines, and he, who never deceived others, and rarely himself, was not deceived in this presentiment. He died eighty-two years old, on the 5th of March, 1856. Two of his pupils and friends have shown what Fuchs did for his country and for science—Professor Dr. von Kobell, in a commemorative oration delivered on the 25th of March, 1856, the anniversary of the foundation of the Royal Bavarian Academy of Science; and Professor Dr. Kaiser, in a necrology, published in the March number of the Journal of the Society of Arts and Manufacture of the Kingdom of Bavaria.

DR. M. PETTENKOFER.

APPENDIX.

I.

Report by Daniel Maclise, Esq., R.A., *on the "Water-Glass" or "Stereochrome" Method of Painting.*[1]

Being required to describe the method of Stereochromy, and to state my opinion of that process as adapted for mural or monumental painting, I attempt the fulfilment of this duty the more willingly, now that my daily practical experience confirms me in the belief that this process can supply to the artist a ready means for realizing some principal objects of his desire, which, hitherto, he could not equally attain even at the cost of much labour and anxiety. In order to explain by what conditions, and owing to what results, stereochromy is to be regarded as better fitted for the execution of mural painting than fresco, it will be necessary to bring here under comparison the leading features of both processes so as to estimate fully their respective merits, chemically as well as artistically.

My attention was directed to the new art of stereochromy, as successfully applied to mural decoration, at the time when, having completed my cartoon illustrative of the meeting of Wellington and Blucher on the field of Waterloo after the victory, I was about to engage in the task of reproducing the picture in fresco. In preparing to effect this, I became anxiously mindful of the many and various difficulties to be encountered, and these seemed almost sufficient to dissuade me from the undertaking. Of those difficulties, such as they are, the fresco-painter of modern times is painfully aware, and so likewise

[1] *Vide* Twelfth Report of the Commissioners on the Fine Arts.

must have been the greatest masters of that ancient art—for it appears, beyond question, that the fresco-process is now carried out in the same manner as it has ever been—the artist being confined within the limits of the applicability of very scant materials, and, while working with these, doubtful as to their effect, his feeling aspiration subdued by the disheartening conviction that his art is the slave of his means; since, whatever be the style of subject to be treated in fresco, and however simple in its design it may appear, the obstacles to be overcome are still in such obstructive force as to be positively repellent to the artist. It is not to be wondered at, therefore, that he ever inclines to adopt any other process. And, considering the nature of the subject which had been allotted to myself—a subject illustrative of an event within the memory of many, and witnessed by not a few to whom the veracity of details even in respect to the form, material, and colour of a buckle, a button, or a tassel, might seem so necessary to be observed that any error would be judged as a culpable anachronism — the reason will be very obvious why I despaired of being enabled to finish in fresco that particular subject above all others, and why I hailed, with no small amount of satisfaction, the stereochromic method from the hopeful promises it held out.

The truthful delineation of a multiplicity of characteristic details[1] being necessarily required for my subject, and stereochromy offering the ready practical means for expressing the qualities I wished, I was fortunate in being furnished with a copy of a publication on the nature of that art (translated and issued for private circulation by direction of His Royal Highness the Prince Consort), entitled "On the Manufacture, Properties, and Application of Water-Glass (soluble alkaline

[1] A very small portion of these details could only be painted on the fresh-laid plaster each day in the old fresco-process, and, therefore, in the progress of the work, would necessitate innumerable joinings of the plaster, and give rise to such complicated and minute cuttings, that it would not be possible to get a mason to execute them—while the ground for a painting in stereochromy is laid all at once, and the work can be left and resumed at pleasure.

silicate), including a Process of Stereochromic Painting, by Dr. John N. Von Fuchs."[1] On perusing this pamphlet with that fixed attention which accompanies an interesting curiosity to know the value of a new discovery calculated to abridge the manual labour of the artist in respect to mural painting, I was destined to feel all the disappointment which one so little acquainted as myself with chemical facts and the nomenclature in which those truths are conveyed might have reasonably anticipated. Quartz, rock crystal, flint, and the various species of sand were only known to me by their sensible properties, while the substance called water-glass, never having seen it, I could not comprehend the nature of. A flint in fluid form was to me a mystery, even though I was told on good authority it was a fact; and the fluidity of a flinty mass, as having been effected by combination with an alkali, such as potash, soda, or lime, appeared to me a state of such matter rendering it wholly unfit to effect the desiderata of fixity and indelibility for a painting on a wall. The state of watery glass, even while I was looking at it, was still no less a cause for wonder than the state of stony water seemed impossible. Nevertheless, thinking that (while the realization of either state was in truth a triumph of the past mental labours of the philosopher) the purpose which water-glass was intended to serve might be effected in a very simple manner by any one, I, in that hope, prepared for my first essay in stereochromy. Having procured a bottle of the concentrated water-glass, and a tablet of unprepared milled-board, which was to serve as a ground for the picture, the necessary pigments were severally mixed in a dilute solution of that liquor; and with them so dissolved, I tried to paint a simple figure; when, almost from the first, it became evident that the vehicle did not admit of being used in mixture with the colours in the manner of varnish or oil, because of its stiffening the brush, and, as it were, petrifying the contents of the palette before the painting could be accomplished, even by the most rapid execution. The result, however, such as it was, left no doubt as to the efficiency of the

[1] Already given at full length.

fluid, in respect to its binding and fixing properties; for the colours as laid on the tablet could not be expunged.

In the next experiment which I tried with the water-glass, I resolved to test its assumed virtues in a mode that would more nearly resemble the conditions under which I would have to paint in the compartment in the Royal Gallery—as to the materials of lath, plaster, &c. On a small wooden frame, barred with laths, were spread two coatings of mortar, made with the ingredients recommended as proper for the fresco-works of the Palace at Westminster; over the first rough ground of mortar, when this had become thoroughly dry, an intonaco was spread, one-tenth of an inch in thickness, and consisting of sand and lime in the proportion of one of the latter to two of the former. On this finished superstratum appearing sufficiently dried and manifesting the requisite amount of absorbency, a figure was painted in colours mixed with water-glass in a state of much weaker solution than that which was first used; and the result proved that, while the fluid admitted of the painting being executed with more facility than in the former trial, yet this was at the expense of the fixing qualities; for the painting, on becoming quite dry, showed that only a few parts of it were set, while all the rest —the greater portion of it—allowed of being disturbed by touch, and the groundwork could be readily laid bare by a wet sponge. The appearance which this picture presented after the lapse of a few weeks was still less satisfactory; some portions of it seeming to be discoloured, and especially so where the surplus fluid had run down over the surface. An attempt made to fix this painting by passing over its surface water-glass, diluted with two parts water, secured the greater portion of the picture; but after a short time an efflorescence appeared on the dark hues, which, however, was easily removable. But though this trial of the fixing qualities of the fluid did not quite answer expectation, it was reasonable to infer that the failure was due partly to its over-diluted state, and, perhaps, also to the ground not being absorbent enough, it having been smoothly trowelled. That these were the causes of failure the pamphlet, on reperusal of it, assured me; and I gathered

from the circumstance that, while the concentrated water-glass did not admit of stereochromic application, the more diluted it was, the more frequently its use in that state became necessary in order to ensure its desired effects. After making a considerable number of such experiments, with more or less success, I would have felt on the whole not very sanguine in regard to the promise held forth by the author of the stereochromic method, but that by the following remark he removed my doubts in some degree:—"Failures, owing to faulty manipulation, frequently caused it to be abandoned before it had been put to a fair test." On this assurance I deferred any further trials until I could witness with what results the new method had been attended, if not in the city of its discovery, at least where its practice was said to be perfected—in the new museum at Berlin.

With this object in view, I visited Berlin in the autumn of last year, and there I had the opportunity of closely inspecting five large and otherwise notable subjects, painted in stereochromy, by Kaulbach, his pupils Echter and Muhr, and with the assistance of others, who were also executing in the same style a series of designs under the portico of the same museum. These works appeared to afford marked evidence of the success of the process—a sixth work to complete the series of the larger set is in contemplation; and for this the cartoon is prepared, being at present in the hall of the new Pinacothek at Munich, where I afterwards saw it. Between the larger compositions above mentioned, there are collossal allegorical single figures, painted also in the new material, and owing their permanency to having been impregnated with water-glass. Of these works it may, indeed, safely be said that they form a series of the noblest embellishments of one of the grandest halls which architecture has as yet dedicated to the development of a kindred art; and here too, is to be viewed in perfection how transcendantly imposing are the results when the two arts are harmoniously combined. On approaching those paintings to examine their (so to speak) structural qualities, I was much surprised at the excessive degree of surface-coarseness; and, as I could not imagine how this condition was

necessary to their effect as works of art, I concluded that its object was to ensure an absorbent superficies for taking in the water-glass with which they had been imbued; and such was the answer made to my inquiries in this matter. This requirement of coarseness, for such an end, did not, however, at the time appear to me feasible, and I have since ascertained experimentally that porosity of matter, such as the plaster-facing of a wall, does not result necessarily from coarse sand or gravel entering into its composition. Another quality, and one which seemed to me as a consequence of this ruggedness of surface, was intrusively observable; the washes of transparent colour which had been passed over the work, perhaps towards its completion, had become stagnant, as it were, in the interstices; and the colouring matter, being there precipitated, gave the unseemly appearance of dark spots between which the calcareous prominences stood out almost wholly bare, and imparted to the entire surface a fatiguing sameness of execution. In order to disguise this blemish to the work, recourse was had to what, in artistic phrase, is known by the term hatching or handling; evidences of which treatment were visible in all parts, but especially so in the shadowed ones. This treatment, however, was productive of an effect more pleasing than otherwise; it served the purpose for which glazing is adopted in oil-painting, and, because of the colours having been laid on in long, transparent lines, in agreeable conformity with the objects delineated beneath, the first laid hues of these became modified as by the fusion of tints observable in the rainbow—blue passing into purple, red into orange, and yellow into green. Another ill consequence of the roughness of the ground was the settlement of dust on prominent points, and this so falsified the artist's intention as to appear incongruously light in shadows and *vice versâ*. The same causes of the same evil I had previously noted in all the old frescoes of Italy, the plaster surfaces of which are not uniform planes,—and as these inequalities serve but as receptacles of the extraneous matter, this, from having been so long undisturbed, has incorporated itself with the substance of the plaster, to the great deterioration of the pictures. The works at present

under notice displayed, however, in the greatest perfection, those qualities which are particularly expected from stereochromy as serving for monumental painting—their indelibility was accomplished and their flatted non-reflecting surface secured.

Having become satisfied of the efficiency of the stereochromic method as practised by others, I availed myself of the opportunities of my situation at the time to try its effects under their guidance; and, to this end, I had prepared for me, by the kind offices of Baron Von Olfers, Director of the Museum, a moderately rough plaster tablet, as he recommended, for my purpose. All necessary colours and brushes being likewise supplied me, I painted a figure, using distilled water as the vehicle for the pigments. I should not omit to say that the tablet had been previously very slightly impregnated with water-glass, diluted, and allowed to dry before I commenced. This essay was made with no difficulty, notwithstanding that it was required to wet the ground frequently with water, as well by means of a large brush as by the sprinkler—an instrument constructed specially for this use, so as not to disturb the colours. I may, however, confess that, by too forcible an application of this sprinkler or syringe, some of my work was obliterated, and tear-like drops carried off with them some delicate pencillings. The object for executing the picture on a groundwork kept constantly moist is that of being able to match the tints uniformly, and, likewise, for giving to the colours a certain amount of adhesion; but, as instanced above, much caution is required in the use of the sprinkler, lest the force of its jet spoil the painting; and this risk is, for the same reason, liable to be incurred when the water-glass is being applied by that instrument. The picture having been completed under these observances, I had the satisfaction of hearing it pronounced as highly successful when its fixation was accomplished. It was begun and completed on the scaffolding, or stage, in presence of the artists employed on the Kaulbach designs; and they gave me, enthusiastically, all needful information as to the process in which they themselves were engaged under the great portico of the Museum facing the Lust Garten; and as it is in this situation that the

stereochromic paintings will be exposed to the atmosphere, *sub cœlo*, they will soon be tried as to the degree of their weather-resisting stability. Should they be found proof in this respect, they will furnish a favourable contrast to the large frescoes situated immediately above them, and which were painted from the designs of Schinkel, the architect of the Museum, while Cornelius directed their execution.

Encouraged by the success of my effort in stereochromy, I felt desirous of trying next whether or not a painting might be made with a like result on a smoother plaster; for in such case I would be decided as to adopting the new process for performing my own projected work in the Palace at Westminster. On a groundwork of this kind I painted a figure with very great facility: but this trial having been made at Dresden, a want of the material necessary for fixing the colours obliged me to defer that operation. In Munich, however, an opportunity for further experiment offered; and, accordingly, I got prepared on two small tiles a plaster-ground, such as is approved of for fresco, but with more sand, and the surface being evenly grained by the method called "floating." The figures painted on these have been indelibly fixed; and the artists who seem best conversant with stereochromy (many disregarded both the process and the result) assured me that any remarkable coarseness of surface for the groundwork was by no means an indispensable condition for insuring absorption of the water-glass. They stated, moreover, in plain disagreement with the recommendation of the discoverer of the new process, that it was on no account necessary to saturate the plaster strata with that fluid in order to fix the painting; and that this object was sufficiently attainable by using the water-glass, with judgment, over the completed picture. In proof of the efficiency of this plan of operation, they pointed to the works so treated in our presence.

The information I received from his pupils was repeated confirmatively by Kaulbach himself—when I saw him afterwards in Munich—in all particulars, save that relating to the surface of the plaster-ground. This he insisted should present a considerable degree of roughness, and he used precisely the

same expression quoted from him by Fuchs—"It should feel to the touch like a coarse rasp;" but, in opposition to his opinion, the Director Zimmermann (Kœnigl. Central Gallerie, Munich), as well as Professor Dr. Pettenkofer and Professor Buchner, told me that such surface was not requisite for any *stereochromic* reason; and, as successful results of the smooth style of painting in that process, they referred me to works before my eyes; and likewise to two just completed, on either side of a porch in the Garden of Liebig, which were at the time being fixed. A very rainy week ensued: but I found that these freshly-painted and exposed pictures were not in the least affected by the weather. The artist, L. Thiersch, said that any kind of ground as to qualities, rough and smooth, was admissible, according to the taste of the painter. A kind introduction from Schnorr procured for me this opportunity for gaining information; and Grüner, of Dresden, exerted himself kindly in my behalf. In the laboratory of Dr. Pettenkofer he showed me a specimen of the same kind of work, thereby strengthening my belief that porosity, which evidently is so requisite for sucking in the water-glass, may and does exist to a sufficient degree in such a plaster-surface as I consider is best suited for my purpose.

Recollecting that in the pamphlet of Dr. Fuchs he recommends that both layers of the plaster of the wall, previously to commencing the painting, should be impregnated with water-glass, and, after being so prepared, should be well dried, I took care to make inquiries whether these measures were absolutely necessary to the stability of the picture, any further than inasmuch as the firmness and integrity of the substrata must conduce to that end. The necessity for this saturation of the wall with water-glass, I was assured, was never felt; and the rule is, therefore, not followed. The plaster strata (consisting of pure quartz sand and lime in union), such as are chosen for forming the groundwork for an ordinary fresco, are considered to be sound enough in themselves for the stereochromate painting. On this kind of ground I saw the artists in Berlin at work; they painted with colours mixed in distilled water as a vehicle. These colours, when become dry

on the wall, I found to be readily disturbed by touch, their fixation being left to be effected by the water-glass when the painting was finished. It is on this principle that the works of Kaulbach are rendered indelible; and that they will endure so the artists have every good reason to believe. As a triumph of stereochromy over ordinary fresco-painting, they assert that the works executed in the former method are indestructible either by fire or water; and, as to their durability, specimens are referred to which have existed for twenty years without exhibiting one symptom of decay. For these reasons Kaulbach regrets that stereochromy was not adopted in painting his designs (illustrating the history of modern German art) on the outer walls of the new Pinacothek, as he feels that he might then have been able to exhibit graces which are unattainable by any other means. These pictures are now much damaged.

The artists, desiring an opportunity for imparting to the old frescoes the virtues of the water-glass, propose to try this experiment on the comparatively modern one painted about 1833 by Neher and Kogel, representing the return of the Emperor Lewis from his victory over Frederic the Handsome of Austria, on the Isar Thor, now very much decayed. I am sure the experiment can only prove a success by first carefully restoring the crumbling ground; but this, as far as I could judge, will necessitate great interference with the painting.

One of the last observations made to me by Professor Pettenkofer (the eminent chemist, and pupil of Dr. Fuchs, who, dying, bespoke his interest in furthering a knowledge of the discovery) in praise of stereochromy, in itself bears cogent reason for the adoption of that process in preference to fresco; the picture, even after having been fixed, admits of being retouched, and carried out to any degree of finish which may be deemed desirable.

The *art* of stereochromy being thus enthusiastically recommended for the adoption of the painter in preference to that of fresco, and such recommendation being supported by actual proofs of its success in supplying him with a means he has hitherto been so much in need of, it cannot but follow that he

should feel inquisitive about the *nature* of the process itself; even though, to satisfy this sentiment, he has to stoop from the region of fancy to the underlying domain of science.

From what information I have gathered by aid of books and conversation, I have formed the opinion, that between the stereochromic and the ceramic arts there exists a close analogy; while the art of fresco is not assimilated to either, except in a very remote degree. The fixation of the pigments by water-glass, on a plaster wall, appears due to much the same circumstance as that whereby the fixity of colours on an article of pottery is effected. In both these operations it is owing to the presence of silica (quartz) in the materials of the ground-work that the painting can be rendered permanently indissoluble, and because this substance being capable of fusion at a certain degree of temperature, involves, while cooling down to a state of solidity, the matter of the colours laid in contact with itself.

Without presuming to explain the process of stereochromy more exactly than what my limited knowledge of the chemical facts will allow me, I would say that what the slab or other form of potter's clay is to the ceramic painter, the plaster wall is to the stereochromic painter; in both materials the substance called silica exists; and this is painted upon directly where it lies at the surface. But while, in the process of baking the article of pottery, the silica in it becomes fused by heat, and at the time the pigments become incorporated with silica, and all together afterwards set fixedly on cooling, a similar result cannot be obtained for the stereochromic painting because of the inadmissibility or rather practicable impossibility of subjecting the wall to the influence of fire. If such were conveniently possible, the result would of course be the same. It is, therefore, upon the happy discovery that silica, rendered soluble by boiling it with an alkali, such as potash, soda, or lime, can in that state be infused into the wall through its facial painting, and so render the latter fixed, that the art of stereochromy mainly depends. This art is new to mural painting, but the chemical fact is of long standing. Soluble alkaline silicate (water-glass) is but ordinary glass in a different form.

Both are compounds of the same materials, and in the same proportions, or very nearly so; and, in fact, the very plaster covering on which the painting is to be made and set is, in itself (as the chemist attests), a similar compound, but one in a different state. Quartz sand, which forms the base of the plaster, is silica; the alkali (soda, potash, or lime), in chemical union with quartz, represents glass; therefore the plaster, formed of quartz, sand, and lime, is of the same matter as glass, the only difference between them being due to a chemical union of the ingredients of the glass, while those of the plaster only hold together united by virtue of the common law of cohesive attraction. It would appear, therefore, that between the plaster and the soluble glass there subsists a natural appetency. The one is desired by the other; the plaster thirsts, and drinks into all its multitudinous pores its vitreous beverage. The similar matters cohere as things physically suited for union, and upon this fact the art of stereochromy is based, and therefore will endure. The process of fresco-painting is conducted according to natural conditions of matter which are more evanescent, and consequently the artist's work is more liable to fall with the wreck of chance or time, as we find it does if not well cared for. The fixation of the pigments in fresco is simply due to the circumstance that the painter, in brushing his colours on the wet plaster, disturbs a certain portion of the lime,[1] which, commingling with them, becomes, by union with the carbonic acid of the atmosphere, hardened into a superficial pellicle, and gives its own consistency to them. This pellicle of painted carbonate of lime is non-absorbent; it becomes in time impenetrable even by simple water, and consequently must prove so against any fluid of greater consistency, such as the water-glass. Hence it seems reasonable to suppose that the application of stereochromy to the preservation of ancient frescoes is but little likely to have this effect, while, at the same time, by the careless use of the water-glass for such a purpose, a danger to the pictures is incurred if that fluid be suffered to remain on the surface, since by exposure

[1] The fixation of colour can be effected when this disturbance is very slight, as at the close of a day's work, but then it is less secure.

to atmospheric influence it decomposes, and turns opaque. The same untoward effect will take place on the stereochromic surface if this, from being oversaturated with the water-glass, bears out the surplus quantity of that liquor.

Before concluding this brief notice of a subject which, from its importance to the artist, claims a very extended inquiry into, and a full recognition of, its deserts, I would add a few remarks in reference to the combinative action which, as I am informed, is understood to take place between the water-glass and the painted plaster on the wall. Upon the knowledge of this depends the confidence we may entertain, that certain appearances should strike us as being of no greater moment than they deserve to be accounted.

The water-glass on being absorbed by the plaster is considered by some to undergo no chemical change, but simply to enter the porous mouths of microscopic canals by the law known as "capillary attraction." In these canals it undergoes a petrifaction or vitreous solidification; and in this manner imparts greater density to the plaster and coherency to the particles of pigment through which it primarily passes.

By others it is believed that the water-glass, after being absorbed, *does* suffer chemical disintegration by reason of the silica having a freater affinity for lime than for either the soda or the potash; and that, in giving up the latter, it unites with the lime of the plaster—forming a silicate of lime.

It matters not, however, which hypothesis is the more worthy of credit, for the result, in regard to the painted work, is the same; its fixation is accomplished by cementation with the plaster, though it is true that the pigments do not penetrate this, as the water-glass does, but remain as a scum or pellicle on the surface. Of this fact I have satisfied myself by making sections of fresco, of stereochromic, and of ceramic paintings; and no doubt it happens by reason of the circumstance that the particles of pigment are severally of larger dimensions than the pores of the substratum of plaster will admit to enter them.

The pigments proper for stereochromic painting are of the same number and kind as those found admissible for fresco-

painting. Those which are of the *organic* class, whether animal or vegetable, are said to fade from decomposition when brought in contact with the lime of the plaster; but for my part, I have found reason to believe that, in most instances, what is considered to be a fading of these colours is only due to a resumption of their original hues, such as they present to the eye when in their dry powdered form. All colours whatever are rendered of richer, deeper tone by admixture with a vehicle, be this oil, varnish, or simple water; and when either of these fluids becomes dissipated by evaporation or otherwise, they assume a lighter, fainter tint, as is well known to the fresco-painter, but the oil or water-colour painter never sees the colour in its simple hue unsustained by, and without the enrichment of, oils and gums. However this may be, whether actual decomposition takes place or not by the action of the lime on every kind of organic colour, it appears that the water-glass does not affect them in such wise to any appreciable extent, but, on the contrary, seems to impart to them a translucency not their own originally, or if in a degree their own, it has the enhancing effect of the shower on the rose—dyeing its native hue of a deeper, richer tinge.

December, 1859. DANIEL MACLISE.

Herr Kaulbach has just completed a stereochromic painting of large dimensions in the month of August last, in the cloisters of the Dominican monastery at Nuremberg. He recommended me to see it, as he had been trying some few novelties in the process of painting, as well as a new kind of ground. By the favour of the director, Baron von Aufsess, I had an opportunity of inspecting this picture. It has been executed on a ground of Portland cement and sand, such as is highly recommended by Professor Pettenkofer, of Munich. It is the only instance as yet in which this cement has been employed for this style of painting, if I except a trial made with it myself; and I have reason to believe it would present some difficulty to the painter, in consequence of the dark nature of the plaster, which, especially when wet, might not be suitable

for a subject requiring a light scale of colour; but for the work now noticed, it appeared to answer very well, as the subject was one of gloom, and the light of the picture artificial.

The latest experiment I have made in stereochromy has proved the most successful. The picture is painted on a tablet formed of laths covered with three coatings of mortar; the two under-coatings of lime and river-sand consisted of 1 part lime to 3 of sand, the intonaco 1-10th inch in thickness, of 1 part lime to 3 fine siliceous sand, such as is used by the artists in the New Palace at Westminster; this upper stratum has been hand-floated somewhat roughly. My object has been to make this surface, and the whole composition of the tablet, to resemble as closely as possible the large panel in the Royal Gallery, so that it might fairly serve in regard to the process I shall have to adopt there. Before I commenced painting on it I wetted it over with a solution of lime-water, and while it was still wet I began the figure, finishing as I progressed, and in half an hour the ground having become dry, I could see the effect of the portion I had completed. I then again wetted an adjoining piece, and so on to the end. In the mode of working I found I could freely, carelessly, use a stiff hog-hair brush to rewet what I had painted without risk of displacing the colour, or in any degree injuring what I had finished. In one spot I wished to restore the ground after I had coloured it, and it was with some difficulty, and only by frequent and forcible use of a stiff brush and a sponge, that I could remove the colour. When quite dry next day, a solution of water-glass was formed of 2 parts water and 1 of the concentrated liquor imported from Berlin, and, this solution having been twice applied, the painting is now perfectly fixed. I have also to remark that in this case the water-glass for fixing the picture had been freely passed over it, with a large flat water-colour brush; and I may further add that I have tried to use in its full force crimson lake (said to be particularly perishable), and as yet it remains without any apparent deterioration. This specimen having been thinly painted, water freely

used, and the ground rendered very absorbent, I note these three conditions to be principal among the causes of the success of the experiment.

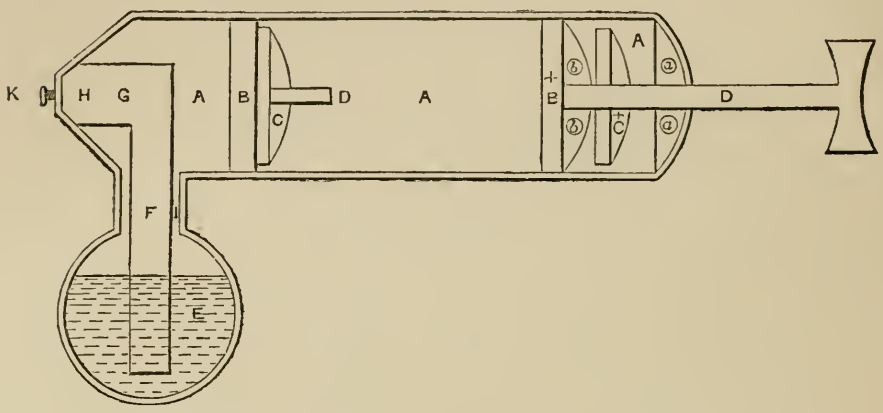

Fig. 1. *Water-glass Sprinkler. Section.*

Fig. 1. A, A, A, interior of cylindrical barrel accessible to air through the air-holes *a*, *a*. B, C, D, piston, valve and rod driven forward, by which the valve C closes the air-holes in B, so that B compresses the air in front of itself, while the external air is entering the barrel behind B through the holes *a*, *a*, else the piston B could not be driven forward. E, glass bottle containing the fluid which is under pressure of the compressed air in front of B, through the neck of the bottle I. F, vertical tube in which the fluid ascends with a force equal to that of the downward pressure of the air on the surface of the fluid through I. G, head of water-tube perforated and fitting into the nozzle H of the cylinder, which is also correspondingly perforated (and is acted upon by two screws K, which increase or diminish the flow) so that the fluid becomes jetted forth in a continuous stream as long as the pressure is exercised. On the piston being retracted from B to B+, the valve C+, separating from B+, opens the air-holes *b*, *b*, in the piston, and then the external air rushing through *a*, *a*, and *b*, *b*, fills the body of the cylinder. But for this provision the retraction of B+ would cause the water E to rise into the barrel retrograding.

Notes added after the Practice of Stereochromic Painting of a Year and a Half.

The extremely absorbent ground procured by rough plastering does not appear to be so essential as I first supposed for the imbibing and setting of the painting by the water-glass.

After the lapse of a year and a half, I do not find that the hardened surface of the plaster wall (carbonate of lime) prevents either the colours from being sucked instantly dry, or the water-glass from being imbibed, even where the wall is smoothest; the wall in question has been unfortunately prepared carelessly, and exhibits every variety of bad plastering. Discoloration is here and there very apparent over the whole surface of the wall, arising from unequal distribution of sand with the lime, but otherwise seems not to have any bad effect.

Tracing over a red or black paper on the wall can scarcely be effected when the plaster ground is rough: when smooth the line effected is clear, and can be very easily made by the stylus.

A ground of Portland cement, without any sand being mixed with it, is extremely absorbent, yet a painting on it is very difficult to fix, and when fixed, appears many degrees darker than when first painted. The execution of the painting is rendered difficult in consequence of the wet colour being instantly sucked dry from the painting-brush. Painting fixed by water-glass can, if necessary for alteration, be painted on and fixed again.

The quality of "impasto" (not now much in favour, even in oil-painting, where the sustaining nature of the vehicle secures for it an unctuous charm,) can hardly be reached, either in fresco or stereochromy. In both, if attempted by loading the pigment, it is apt to fall away, and at best looks only dry. If, however, the painter should deem the raised surface of the impasto desirable, it would be safer to have it secured for him by the plasterer, when spreading the ground. It would appear to be a quality more allied to modelling than painting.

Solid painting is very easily attainable, or rather it can

scarcely be avoided, for even transparent colour in stereochromy assumes a somewhat opaque and solid appearance, and the "luce di dentro" is not seen but in oil-painting. However, some approach to this effect may be arrived at by keeping the white ground pure, and by endeavouring to finish the portion at one painting.

The granulated or ingrained surface, so popular in oil-painting, achieved by passing transparent colour over a roughened ground, so as that the colour shall remain in the interstices, is attained very easily in stereochromy.

Water-glass, if sprinkled profusely and frequently on the picture, will cause it to shine, and consequently darken it, giving also depth and lustre to the colours. Although the unreflecting or flatted appearance of the picture is deemed an essential requisite for mural painting, yet cases may be imagined when the shining surface would present no objection. In such case the picture should be painted of a lighter tone, so as to allow of the darkening glazing effect of the water-glass. If water-glass be applied to a fresco-painting, it will have the same deepening effect, which will, perhaps, interfere with its use to prevent the decay of such works.

So general is the taste for the glossy surface, that such quality alone will secure admiration, and gain for a picture the praise of fine colour, while the contemplation of works embrowned by repeated varnishings has, in a certain degree, vitiated public taste.

I notice that one of my early experiments in stereochromy, which shines under too lavish a layer of water-glass, is always selected for praise in preference to another painted in the same hues but of flatted surface.

I notice when the wall is unequally prepared as to roughness and smoothness that the same quantity of water-glass applied to it will show a tendency to shine on the smoother portions only. If a uniform tint were required, and the plastering treated in an unequal way, such as having a smooth spot in an area of rougher trowelling, the uniformity of tint could not be effected, for the rough work looks darker because of the innumerable shadows in its interstices, and both sur-

faces will exhibit the above-named changes when the water-glass is applied.

The last experiment I have made has been to varnish with mastic varnish a figure painted and fixed in the stereochromic manner. This at least looks dark and rich enough.

There can be little doubt that the dry unshining surface which the painter seeks with such painstaking, both in fresco and stereochromy, is a source of distaste to the general public.

Glazing, a much esteemed expedient of the painter in oil-colour, can be practised (but in less perfection) by the artist in what I may call the old and new fresco styles. In the last, the transparent colour may be passed over that lying beneath, after ten minutes; but in the old style of fresco it cannot well be practised until the close of each day's work. While in oil-painting it is not safe to try the process, in consequence of the under-ground not being sufficiently dry, for two or three days.

Stereochromy is the only method of painting truly described by the term water-colour or aquarelle, being produced by water alone as a vehicle for the colours. What we name water-colours are mixed with gum, honey, or other substance; while distemper-painting is enriched by size. This true water-colour painting has the great advantage of being readily rendered indestructible by an after-process, the application of water-glass, "a soluble alkaline silicate."

Barytes is a white pigment which I have made some experiments with, but I cannot see that it is in any degree preferable to white of zinc. When the plaster surface becomes so indurated as that it might not readily absorb the water-glass in the process of setting, recourse is sometimes had to rubbing the surface with pumice-stone or sand-paper. In doing so, great care must be taken, for the sand, in mixture with the lime is sometimes unequally distributed, and where small masses of the former predominate, they crumble, and the surface becomes broken and pitted. Colour applied to these spots will appear darker than the same tint applied to the undisturbed surface.

The surface of the plastered wall should be treated uni-

formly, or if any variety of surface be admitted it should be with an intention. For instance, a greater or lesser amount of roughness might be desirable for the better expression of the surface of objects. But all accidental varieties of plastering increase greatly the artist's difficulties, making it necessary for him to deal with each change of surface by a different method of pencilling. In the case of an uniform tint, say of sky, being wanted, the trowelling, or floating, as it is called, of the plasterer, should be all of the same uniform treatment. Any variation in the handling of the trowel, for instance, any circular motion of it, leaving a rough or smooth course, will be easily apparent through any amount of colour passed over it.

It has been objected to zinc-white, the white used for stereochromic painting, that it is deficient in body. It has not the solid qualities, indeed, of lime or white-lead; but the artist soon learns to esteem it for the compensating qualities of delicacy and semi-transparency, exhibiting a very favourable contrast to the staring, arid, character of lime when used as a pigment, and taking into consideration the dangerous nature of this latter. Zinc-white, from its delicate nature, allows the water-glass to penetrate through it to the wall, even when used in considerable quantity; but a thin treatment of this pigment, as well as of many others, seems to be, for the above reason, desirable; and this white (when used delicately over the warm white of the plastered wall, the mortar of which is tinged agreeably by its sand,) bears well out, and shows a very agreeable texture. All colours should be tempered by distilled water to as nearly as possible of the same consistency, if only for the reason of receiving the fixing water-glass with the same facility. If one colour be laid on thickly, and another transparently, this last will be more readily set.

The ordinary fresco-ground is smoothly handled with an iron trowel. In getting this smoothness the lime is worked out to the surface, and so separated from the modifying qualities of the sand. The lime, therefore, acts readily on the colours, even from the ground, as well as from its more inti-

mate admixture with them. Such a ground, if painted upon in the stereochromic method, not having sufficient absorptive power, when the water-glass came to be applied, although the pellicle of colour would be set and hardened, yet as the water-glass would not readily be received through the colour into the wall, a great liability would be incurred of the colour falling off in flakes. For this reason the ground for water-glass painting is always more or less rough, and is worked by the mason, in the process called floating, with a wooden hand-float.

My experiments made during the course of a year and a half have not altered or deteriorated in the slightest degree. Colours said to be objectionable have been applied to various surfaces of plaster, as well as to a piece of white marble, to glass, delf, millboard, a piece of oak, deal, pipe-clay, and plaster of Paris. The colours have been laid on in their full force, again thinned with water, and then modified by white, the water-glass applied, and all have been rendered indelible; some, such as the two last-named, requiring only a more frequent application. Ivory black and French ultramarine and lake have been treated as successfully as the more admissible colours on all of the above-named substances. As regards lake, its colour in fresco or stereochromy can never be richer than as we see it in powder, and it does not tell for much. There is a sort of colcothar much more intense than lake, as well as a rich deep burnt sienna, that amply supplies its place.

In inserting some portions of correspondence on the subject of the preceding report, I take this opportunity of expressing my acknowledgments to those scientific professors and artists in Germany who so readily and liberally assisted me in my researches during a visit to Berlin and Munich in the autumn of 1859, and subsequently by answering my inquiries respecting various practical details.

Letter from Dr. Pettenkofer to Mr. Maclise.

(Translation.)

Munich, *November* 19, 1859.

Sir,—Excuse me that I only now answer your letter of the 12th October. I wished to wait till the sprinkler was ready for you. In a few days I shall forward the bellows-sprinkler to your address, and I hope it will arrive safely in London . .

With regard to the use of this instrument I offer the following remarks. If you connect the bellows with the little air-vessel (wind-kessel), that is, with the rectangular pipe of the glass bottle in the stand, and lead the air from this by means of the straight pipe into the sprinkling-bottle, you will be able to create a stream which is continuous, and which, though it remits, never intermits. The winding-up of the bellows in this case must not be done too slowly. The painters here, however, generally prefer to avail themselves of an intermitting stream, which may be obtained by impelling the air out of the bellows direct into the sprinkling-bottle, consequently emptying the air-vessel (wind-kessel). In treading the bellows, the centre of gravity of the person is changed in this way, viz., by throwing the centre of gravity, in winding up the bellows, on to the left foot, which rests on the little footstool next the bellows; and, in pressing out the bellows, on the right foot; at the same time mounting on the bellows as upon a stair. The right movement does not tire. If you tire, it shows that you have not attained the right movement, which, however, by a peculiar motion of the knees and swaying of the body, you soon acquire.[1]

As to the preparation of the ground, you will best effect your object by causing experiments to be made in the following manner:—Spread on a wall of brick, or on a plate of burnt clay, a mortar composed of three parts of coarse sand and one part of Portland cement, with the necessary quantity of water. This surface (not above half an inch thick), when still fresh, is covered with a thin coating of fine mortar,—the so-called sweating-mortar—which consists of three parts of fine sand,

[1] The instrument here described has, after all, not arrived.

—sand composed of carbonate of lime (kohlensaurem-kalk) is the best, and one part of Portland cement (or, if you wish the ground to be more absorbent, with Roman cement,) and soft water. The sand and cement for the sweating-mortar must be rubbed through the same sieve. The fineness of the sieve must be regulated according to the requisite quality of the surface of the wall on which you wish to paint. The sweating-mortar need not be thicker than between one and two-twelfths of an inch. As soon as the upper layer has sufficiently sucked, it should be made even with the proper instrument, and when this is done throw on with the trowel some of the same sand which has been used for the sweating-mortar; as much as will stick to the wet wall. The sand must be as dry as possible, so that it may easily suck up the moisture from the wall. After some time (a quarter of an hour) take off the sand with a sharp-edged iron ruler, and shave off at the same time as much of the upper crust of the sweating-mortar as to leave the surface rough to the finger, so that a drop of water cannot rest upon it, but is quickly absorbed. After that, throw dry sand again upon the wall, as much as will stick, and let it dry out. Smaller surfaces can be prepared and treated with sand by one mason, but two masons are requisite for larger spaces; one to apply the sand to the parts the other has prepared. If the sand is thrown upon a dry surface it does not take effect. After the wall has been well dried and the cement is hardened, sweep away the remaining sand with a not too stiff hair-broom. Then wet the prepared surface with a saturated solution of carbonate of ammonia (kohlensaurem-ammoniak) in water, either by wiping it over with a large broad brush, or, for larger surfaces, applying it with a common sprinkler. As the ammonia smells strongly, it is necessary, in preparing large surfaces, to obtain an immediate draught of air by means of open windows and chimney. The wall is now prepared for painting.

As regards the water-glass, only kali water-glass should be used. It is composed of quartz powder and purified (gereinigte) potass 3 3 3, according to Fuchs' direction. The solution of this kali water-glass, of 1·2 specific gravity, is

mixed with the fourteenth part of a caustic alkali (ätzkali-lauge) of 1·33 specific gravity, thus forming what may be called the fixing water-glass. This, in the actual fixing, is generally diluted with one quarter part of water.

Should you have any doubts as to the process, or find any difficulty in trying it, I beg you to let me know. Professor Hofmann, who lives near you, will perhaps clear up any doubt. I am, &c.,

Dr. M. Pettenkofer.

D. Maclise, Esq., R.A.

Letter from Herr Dielitz, of the Berlin Museum, to Mr. Maclise.

(Translation.)

Berlin, *November* 21, 1859.

Sir,—I have received your letter of the 15th. I proceed to answer the questions you have addressed to me respecting some details in the stereochromic method of painting. You ask, "If water-glass has been mixed with the cement spread on your tablet?"

1. The tablet, formed of ordinary mortar, is again covered with a layer of cement, which layer contains no water-glass.

2. But the cement of the tablet afterwards (and before you began to paint) received a slight wash of water-glass. Without that operation the layer of cement would have been ill adapted to imbibe the colour.

3. The degree of smoothness in the cement depends entirely on the taste of the painter. If you prefer a smooth ground for your work, you have only to use a finer sand. If you like a rough ground, use a coarser sand.

4. The proportions which we commonly adopt in forming a cement are, one part of lime to two or three of sand, accordingly as the lime is more or less rich. Everything depends on the quality of this last material, which differs much according to the geological conformation of the quarries whence it is procured.

Begging you to make use of me in any way in which I can serve you, I have, &c.,

D. Maclise, Esq., R.A. F. Dielitz.

Letter from Herr Dielitz to the Secretary.

(Translation.)

Berlin, *September* 3, 1860.

Sir,—I have obtained the necessary information respecting the question of the employment of lime-white instead of zinc-white in mural painting; and I have to acquaint you that the lime-white is considered decidedly inadmissible, because the water-glass and the lime do not agree. On my observing that the lime which forms one of the ingredients of the ground of the painting ought on this account to be also opposed to the water-glass, and might consequently interfere with and hinder the success of the method, I was answered that in the latter case the water-glass, assimilating with the sand, the other ingredient in the ground, is no longer exposed to the influence of the lime. I am too little initiated into the mysteries of chemistry to decide how far this argument is well-founded; but I believe it would be safest to abstain from the use of lime-white in the painting.

I then spoke of Mr. Maclise's statement respecting the unsatisfactory result of his use of the water-glass which I sent him. The sum of the explanation I have had is, that the operation of fixing depends on so many circumstances that it is impossible, without being present, to prescribe invariable and certain rules on this subject. Experience alone can overcome the obstacles with which, in different cases, the operator may have to contend.

Lastly, I also inquired as to the quantity of diluted water-glass which would suffice to fix a surface of the extent you named. The quantity reckoned would be about 30 Berlin quarts (the Berlin quart is very nearly the same as the London quart, four making a gallon); remembering, however, that the calculation would depend on many particulars of which it is impossible to judge without witnessing them on the spot. At present there is no water-glass ready in the ateliers of the Museum. There will be a supply in about a month. Accept, sir, the assurance, &c.,

F. Dielitz.

Sir Charles L. Eastlake.

Letter from the Secretary to Mr. Maclise.

Dresden, *September* 7, 1860.

. . . In Berlin I did not omit to see Herr Dielitz. I found him most ready to give to give me information. Most of the questions I put to him (from your list) he answered at once. One or two others he replied to by a note, which I can show you hereafter; but I give you the substance now in the enclosed "Queries and Answers." He gave me the address of some manufacturers who prepare the water-glass; Kuhnheim and Co., 26, Linden Strasse. On going to them I found that they prepared two sorts. One is the soda or natron water-glass; the other is the kali or potass water-glass. It seems that Professor Pettenkofer inclines to the latter. [See a subsequent letter from Munich.] To make sure, I ordered a large stone bottle of each. . . . The usual mode is to dilute the water-glass, as prepared, with two parts of water to one of water-glass. When so diluted, a painting 50 feet long by 12 high would require about thirty quarts (English measure) to fix it; consequently, ten quarts of the concentrated water-glass.

Queries[1] and Answers.

1. Is it the practice of Kaulbach to leave the white wall when he considers it desirable; as, for instance, in a large mass of white drapery: or would he use the white pigment?

The painter may please himself. The white wall may be left or not, according to his practice.

2. Is the use of colours unmixed with white of zinc recommended, as securing more transparency?

The colours may be used without white in cases where depth is required, and, in short, when the artist pleases.

3. May lime-white be used?

No. See also Herr Dielitz's written reply.

4. Is much water used with the colours?

The painter may please himself. Much depends on the season of the year and the state of the atmosphere.

[1] Suggested by Mr. Maclise.

5. Is the process called "hatching" generally adopted?

There is no objection to it; it depends only on the habit of the painter.

6. May not the water-glass be applied with a soft brush instead of the syringe in the fixing-process?

No. The syringe alone is to be used, and carefully, so that the water-glass be everywhere equal.

7. May not the process of imbuing the wall with water-glass previously to painting be dispensed with?

It is quite unnecessary; it is no longer done.

8. (Reference to the water-glass sent from Berlin, which failed to fix a painting in three applications.) Would not one or two applications of a strong solution of water-glass be as efficient as three or four of a weak solution. The former would be less liable to disturb the colour?

It is better to use a diluted solution repeatedly till the painting is fixed. The painting must not shine.

9. How long will the water-glass keep before it loses its power?

Herr Dielitz has seen it used after three years. It does not appear to be the worse for time; it only acquires a slight yellowish-brownish tint. It has such a tint in a certain degree at first.

10. In a painting which is to occupy a year in its execution, may the artist wait till the painting is finished, before setting it; or would it be well to fix it in portions, as he progresses with his work?

If the painting can be kept uninjured, it is better to wait till it is finished. If fixed in parts there would be a danger of the result of the operation being unequal.

11. Why does Kaulbach recommend a very rough ground?

Only, it is supposed, because the mere colour remains firmer. When the work is fixed, all surfaces are alike. Kaulbach's practice in this respect is considered arbitrary and peculiar.

12. Many of the smaller paintings in the lower rooms of the new Museum at Berlin seem painted in stereochromy on a

smooth ground. Had the artists any difficulties to overcome in consequence?

It is not supposed that they had. The smoothness or roughness of the ground seems to be matter of choice.

13. After setting the painting with water-glass, can the artist return with water-colours, and again set the retouched portion?

Yes, if the setting is not too strong. The weaker the setting the easier the retouching. It is difficult to confine the re-fixing to the retouched portion, and it is desirable that the fixing should be as equal as possible.

With regard to the fixing process, Herr Dielitz remarked that experience alone must guide the artist or operator. Some colours, such as the ochres, receive the water-glass well; others, such as cobalt, require a longer application before they can be fixed.

I am, &c.,

D. Maclise, Esq., R.A. C. L. Eastlake.

Letter from the Secretary to Mr. Maclise.

Munich, *September* 14, 1860.

. . . . While in this city I was anxious to see Professor Pettenkofer . . . .

I asked him which was to be preferred, the kali (potass) water-glass, or the natron (soda) water-glass. He says he is now convinced that the kali is quite safe, while the other is apt to come up on the surface of the painting.

He says decidedly that lime must not be used for the white, but only zinc-white.

He thinks it better to finish the whole picture before fixing any portion.

He recommends the machine which he described in his letter to you, as preferable to the sprinkler, as it is less fatiguing. The artists find that the sprinkler (when used for wetting the surface only during painting) tires the arm, so that it is not easy to execute with delicacy for a time afterwards.

He showed me a wall-painting in his rooms. (He now lives in the Residenz, and I don't know whether you saw the painting.) The figure (a peasant-girl), with landscape, sky, and steps in front, occupies three or four feet in height; the wall beyond is painted in compartments and arabesques; so that the whole work is about 15 feet high by about 8 wide. The whole, he says, was fixed by the machine in two hours.

The ground was not common mortar (lime and sand), but cement. Portland cement he says is the best that can be used. He assumes that your ground is composed of that cement (which he recommended you to use as the ground of the painting), because it can be smoother in surface than the ordinary ground. Though smooth, it absorbs readily; whereas if the ordinary ground is used it should be rougher, to assist the absorption; and this is the whole explanation of Kaulbach's rough ground; at least so far as any reason beyond mere fancy can be assigned.

He says you must not be alarmed if, after sufficient fixing, a little colour comes away. He struck one of the flat red-painted compartments (round the central figure above described) with a white towel, and showed me that it was tinged a little with red. He rubbed his fingers over the same place, and after a time said, "Now no more will come away; it is fixed underneath, and nothing would have been gained to fix the superficial dust."

He showed me the colours (on the painted wall) that were difficult to fix. Black is one, cobalt another, chrome red a third. He says he recommended you, and he still recommends you, to use a little *caustic potass* with the water-glass in fixing, in the proportion of 1 of caustic potass to 15 of water-glass. The caustic potass is to be added before fixing.

But in order to fix the three colours above-named the caustic potass is to be omitted; the water-glass then remains longer liquid. In fixing such colours the pencil or brush may be used.

I asked him whether the brush might not be used everywhere. He admitted that, after the first fixing, so that the colours cannot be easily disturbed, the brush might be used.

But whatever the mode of operation the liquid should not be allowed to run down. The fixing with the sprinkler is much longer than fixing with the brush.

I asked him about the degree of dilution for the concentrated water-glass. His answer was that for the ordinary ground the proportion of 2 parts of water to 1 of water-glass was right, because the wall does not absorb so much; but when the ground is cement, as above described, the proportion should be 1 of water to 2 of water-glass.

He was not quite sure whether the water-glass used in the Museum at Berlin is kali alone or a mixture of kali and soda. The question could be referred to Herr Dielitz, if necessary.

It seems that even in the open air here water-glass has lasted, while frescoes (on the same building) have decayed.

I am, &c.,

D. Maclise, Esq., R.A. C. L. Eastlake.

Names of the principal colours used in Germany in the stereochrome or water-glass method of painting:—

Weiss.	Hell Blau.
Hell Oker.	Dunkel Blau.
Gold Oker.	Hell Blaugrün.
Dunkel Oker.	Mittel Blaugrün.
Umbra.	Dunkel Blaugrün.
Gebrannte Umbra.	Hell Grün.
Gebrannter Hell Oker.	Grün Oxid.
Gebrannter Dunkel Oker.	Dunkel Grün.
Gebrannte Terra di Siena.	Hell Roth.
Graue Erde.	Braunschwarz.
Hell Oxid.	Braun Oxid.
Mittel Oxid.	Hell Kadmium.
Violett Oxid.	Dunkel Kadmium.

November 7, 1859.

I believe, notwithstanding all my postscripts and added notes to the Report on Stereochromy, I have forgotten to

allude to the effect I was so pleased to witness in Berlin of the power of shedding, by means of the sprinkler, a spray of coloured water over any portion of the wall-painting where it might be deemed necessary. I made, a few days since, some very easy and pleasing changes in hues by this method, the colour of course being very much diluted so as readily to pass through the very small perforations of the instrument. There is another remark to make with regard to this instrument. I have said that if an ordinary syringe were provided with a mouth-piece, perforated and constructed like those I purchased in Berlin, it would have the same effect. When I conjectured this, I thought the glass bulb, for the reception of the water or water-glass, which is affixed to the syringe and supplies it, might be dispensed with, and thereby lighten it and render its use less fatiguing. I find, however, that the fluid must be supplied to the present machine in the way it is, for the necessary smallness of the apertures would prevent its imbibing the fluid, as in the manner of an ordinary syringe, from a detached receptacle, at least in sufficient quantity.

DANL. MACLISE.

March 27, 1861.

II.

Lists of Works upon Painting, in Various Languages; of Painters; and of the Principal Existing Mural Decorations.

WORKS UPON PAINTING.

LATIN WORKS.

L. Bapt. Alberte, de Pictura, libri. iii. Basil, 1540, 8vo.; translated into Italian, Venice, 1547, 8vo.; into French, by Jean Martin, Paris, 1553, fol.; into English, by Leoni, 1726 and 1739, 3 vols. fol.

Joh. Molani, de Picturis et Imaginibus Sacris, libri ii. Leovard., 1570 and 1594, 8vo.

Robert Fludd, or, de Fluctibus, Tractatus de Arte Picturæ. Francof., 1624, fol.

Jul. Cæs. Bulenger, de Pictura, Plastice, et Statuaria Veterum, printed in his Opuscula. Ludg., Batav., 1621, 8vo.; separately, under the same title, 1627, 8vo.; translated into English, London, 1657, fol.

Franciscus Junius (Dujong), de Pictura Veterum. Amst., 1637, 4to; augmented and corrected by Grævius. Rotterdam, 1694, fol.; containing list of ancient articles in alphabetical order.

Speculum Imaginum Veritatis accultæ per Symbola et Emblemata. Auct. Jac. Mosenio, Col., 1661, 1681, 8vo.

De Graphice sive Arte Pingendi; which is the fifth chapter of the work of Ger. J. Vosius, entitled de Natura Artium.

Joannes Schefferi, Argentinensis, Graphice, id est, de Arte Pingendi. Norimb., 1669; Upsal, 1699, 8vo.

De Inanibus Picturis, Diss. Joa. Fr. Jungeri. Lips., 1679, 4to.

Dissert. de Pictura, Auct. Hulderic. Sigism. Rothmaler, Jen. 1692, 4to.

De Lectione Poetarum recentiorum Pictoribus commendanda, Programma, Joh. G. Jacobi. Hal., 1766, 4to.

De Pictura contumeliosa, Diss. Joh. Zud. Kluber, Erl., 1787, in 4to.

Car. Hodsby di Hoda, Ars delineandi Coloribusque Localibus adumbrandi. 1790, 8vo.

Car. Adol. Du Fresnoy de Arte Graphica. Paris, 1658.

Martin Frisins, de Erroribus Pictorum. Hafniæ, 1703, 4to.

Muller, de Pictura, Dissertatio Juridica. Jen. 1712, 4to.

Brunguelli, de Pictura Honesta ac Utili. Jen. 1733, 4to.

C. F. Voita Berg, de Pictura Famosa. Jen. 1703, 4to.

Fichtner, de eo quod justum est circa Picturum. Altorf. 4to.

Theoph. Boerner, super privilegiis Pictorum. Lipsiæ, 1751, 4to.

ITALIAN WORKS.

Discorso eruditissime della Pittura, con molte sogrete Allegoric, circa le Muse, Mar. Equicola. Milan, 1541, 4to.

Dialogo de Pittura di Paolo Pino. Ven. 1548, 4to.

Trattatello della nobilissima Pittura, e della sua Arte, della Dottrina, e del Modo per consequirla agevolmente, da Mich. Aug. Biondi. Ven. 1549, 8vo.

Il Disegno del Anton. Franc. Doni, dove si tratta della Scoltura, Pittura, de' Colori, de' Getti, de' Modegli, con molte cose appertinenti a quest' Arti. Venegia, 1549, 8vo.

Introduzzione alle tre Arte, del Disegno, Vite de' Pittori da Vasari. L'Aretino, Dialogo della Pittura, di Lod. Dolce, nel quale si raginao della Dignita di essa Pittura, e di tatte de Parte necessarie che a perffeto Pittori si acconvengano; con Esempi di Pittori ant. e Mod. e nel Fine si fa menzione delle Vertù e delle Opere del divin Tiziano. Venice, 1557; trans-

lated into French, Rome, 8vo; into English, London, 1782, 12mo.

Osservazioni nella Pittura, di M. Aristofane Sorte. Venice, 1580, 4to.

Lettera di Bartolomeo, Ammanati, sopra le Pitture menche oneste. Firenze, 1582, 4to.

Il Reposo di Raffaelo Borghini, in cui si favella della Pittura e della Scoltura, et de' più illustri Pittori e Scultori, antichi e moderni. Firenze, 1584, 8vo. Another edition augmented and corrected by Ant. Mar. Biscioni. Firenze, 1730, 4to. Another, and a much later one, in 3 vols, 8vo.

Parere sopra la Pittura, di M. Bernard Campi, Pittore Cremonese, Cremona, 1584, 4to.

Discorso d'Allessandro Lamo, intorna alla Scoltura et Pittura, Cremona, 1584, 4to.

Trattato dell' Arte della Pittura, ni' quali si contiene tutta la Teorica e la prattica di essa Pittura, da Giov. Pav. Lomazzo, Mil. Pittori, div. in vii. libri. Milano, 1584, 4to. The same work is to be found under the following title:—Trattato dell' Arte della Pittura, Scoltura, et Architettura, da G. P. Lomazzo, Mil. Pitt. div. in vii. libri, ne' quale si discorre della proporzione, de' Moti, de' Colori, de' Lumi, della prospettiva della Prattica, della Pittura, e finalmente de le Storie d' essa Pittura, con una Tavola de' Nomi de tutti le Pittori, Scultori, Architetti, e Matematici, antichi e moderni. Milan, 1585 and 1590, 4to. An English translation by Haydok, London, 1598, fol.; a French one of the first book, Toulouse, 1649, fol.

By the same author, Idea del Tempio della Pittura nella quale si discorre dell' Origine e del Fondamento della cose contenente del trattato, dell' Arte della Pittura. Milan, 1571, 4to.

De' vari Precetti della Pittura de Giovanni Bat. Ammenini da Faenza, lib. iii., ne' quali con bell' ordine d' utili e buoni Avvertimenti per chi desidera in essa Farsi con prestezza eccellente si dimostrano; Modi principali del disegnare e del dipingere, di fare le Pittura che si convengono alle Condizione de' Luoghi e delle Persone. Ravenna, 1587, 4to; and Venice, 1678, 4to.

Il Fologino, Ovvero del Fine della Pittura; Dialogo del P. D. Gregorio Commanino, Canon. Later. nel quales mostra qual siu l' imitare piu perfetto, o il Pittore, o il Poeta. Mantova, 1591, 4to.

Difinizione e Divizione della Pittura, di Giovan. Batt. Paggi, Mobile Genov, e Pittore. Geneva, 1607, fol.

L' Idea de Pittori, de' Scultori, e degli Architetti, del Cav. Feder. Zuccheri, in due libri. Torino, 1607, 4to. This work is to be found also in the sixth vol. Raccolta di Lettero sulle Pittura, Scultura, e Architettura. Rome, 1754, vii. vols., 4to.

Avvertimenti e Regola sopra l' Architettura civile e militare, la Pittura, Scultura, e Prospettiva, de Pier. Antonio Barca. Milan, 1620, fol.

Trattato della Pittura, fatto a commune Beneficio de' Virtuosi, da Fra. Dom. Francesco Bisagno Cavaliere di Malta. Ven., 1642, 8vo.

La prima parte della Luce del dipingere, di Crisp, del Passo. Amsterd., 1643, fol.

Trattato della Pittura, de Liornardo da Vinci, dato in Luce con la Vita dell' estesso Autore, seritta da Raff. Du Fresne. Paris, 1651; and Naples, 1733, fol., with engravings after designs by Poussin. A new edition was published in Florence, 1792, 4to., with life of the author by Franc. Fontani. French translation by Rol. Freart de Chambray, 1651, fol., 1716, 1724, &c.; English, London, 1721, 8vo.

Trattato della Pittura e Scultura, uso ed abusu loro, composto da un Teologo (Pere Ottonelli), e da un Pittore (Pietro da Cortona), in cui si risolvono motti Casi di Conscienza intorno al fare e tenere, le Imagine sacre e profana; si riferiscono molte Historie antiche e moderne, si considerano alcune Cose d' alcuni Pittori morti e famosi del nostro Tempo, e si notano certi particolarità circa l' operare secondo l' Osservazioni fatte in alcune Opere, di Valent. Zuomi. Firenze, 1652, 4to.

Il Microcosmo della Pittura di Franc. Scanelli do Forli. Cesena, 1657, 4to.

Arta del Navigar pittoresco, dial. in quarta Rima, in Dialetto Venez. da Marco Boschini. Venezia, 1660, 8vo.

Le Minere della Pittura, di M. Boschini. Venice, 1664, 4to.

In de Prodromo alle Arte maestra, di Franc. Luna. Brescia, 1670, fol.

Riflessioni sopra la Pittura di Nicolas Poussin in the Vite de' Pittori, de Scultori, ed Architette moderni, Bellori. Rome, 1672, 4to.

Il Vocabolario Toscano dell' Arte del Desegno, co' propri Termini e Voci non sola della Pittura, Scultura, e d' Architettura, ma ancora di altre Arti, e che hanno per Fondamento il Disegno, di Fil. Baldinucci. Firenze, 1681, 4to. A new edition by Ant. Mar. Biscioni. Florence, 1730, 4to.

By the same author, Lettera nella quale si risponde ad alcuni quesiti in Materie di Pittura e Scultura. Rome, 1681, 4to.; and of La Veglia, Dialogo di Sincero Vero (Philip Baldinucci), in cui si disputano, e scogliono varie Difficultà pittoriche. Lucca, 1684, 8vo.; and in the Raccolta di alcuni Opuscoli da Fil. Baldinucci. Fir., 1765, 4to.

Bellori, della Pittura antica. Venez., 1697.

Le Pittura in parnasso, du Giov. Mar. Ciocchi, Pittore. Firenze, 1725, 4to.

La Teorica della Pittura, ovvero Trattato delle Materie più necessarie per apprendere con Fondamento quest' Arte composto da Ant. Franchi, pittore Lucchese. Lucca, 1739, 8vo.

Sfozamento d' ingegno, sopra la Pittura e la Scultura da P. Franc. Minozzi. Venice, 1739, 12mo.

Dialoghi sopra le Arti del Disegno; Bottari. Lucca, 1754, 8vo.

Avvertimenti di Giamp. Cavezzoni Zanotti, per le incaminamento di un Giovane alla Pittura. Bal. 1756, 8vo.

Dissertazione sopra l' Arte della Pittura dell' Abbate Giovanni. Andrea Lazzarini, in p. 97. vol. ii.

Nuova Raccolta d' Opusculi scientif. et filo., reprinted at Pesaro, 1763, 4to.; and in Catalogo delle Pitture nelle chiese di Pesaro. Pes. 1783, 8vo.

Saggio sopra la Pittura, Count Algarotti. Livorno, 1763, 8vo; a French translation by Pingeron, Paris, 1769, 12mo; English, 12mo, 1783.

L' Idea del profetto Pittore del Servire di Regola nel Guidizio, che si deve formare Intorno all' Opere de' Pittori, accresciuta della Maniera di dipingere sopra la porcellane, Smalto, Vetro, Metalli, e Pietre. Venice, 1771, 4to.

Dell' Arte di vedere nelle belle Arti del Disegno, secondo gli principi di Sulzer e di Mengo. Venice, 1781, 8vo.

Dell Arte Pittorica, poem by Count Ad. Chiusole. Venice, 1768, 8vo.; abridged under the title, Precetti della Pittura. Vic., 1781, 8vo.

Storia della Pittura in Italia da Luigi Lanzi, six vols., 8vo. Bassano, 1809.

Vicenzo Requeno, saggi sul Ristablimento dell' Antica Arte de' Greci e Romani, Pittore. Rome, 1786; a second edition in two vols. Parm., 1787.

Storia della Pittura e della Scultura dei Tempi antichi, written in Italian and English; the latter entitled, The History of Painting and Sculpture, by Thomas Hickay. Calcutta, 1788, 4to.

Trattato della Nobiltà della Pittura, composto ad instanza della Venerab. Comp. di S. Lucca, et della Nob. Acad. de' Pittori di Roma. da Rom. Alberti. Roma., 1585, 4to.

Zezioni (2) di M. Ben. Varchi. Firenze, 1549 and 1590, 4to.

Qual sia più nobile la Pittura, o la Scultura? Gli Onori della Pittura, e della Scultura, Discorso di Gianb. Bellori. Lucca, 1677, 4to.

Pregi della Pittura, di Dom. Palletta. Roma, 1688, 8vo.

La Pittura in Giudizio ovvero il Bene delle oneste Pitture, ed il Male delle Oscene, di C. Gregor, Rosignoli. Venezia, 1696, 12mo; another edition, Bologna, 1697, 12mo.

Le tre belle Arti in Lega con l' Armi per difesa della Religione, Oraz. di Vene. Lucchesini. Roma, 1716, 8vo.

Orazione in Lode della Pittura, Scultura, ed Architettura, da Nicolas Fontongueri; printed in vol. ii. Prose degli Arcadi. Rome, 1718, 8vo.

Orazione della Pittura, Scultura, ed Architettura, giovano per l'acquiste della Scienze, da Vinc. Santini, in vol. iii. of the same work.

Orazione in Lode della Pittura, Scultura, ed Architettura di Giambattista Alesandro. Moreschi. Bologna, 1781, 8vo.

Esame razionata sopra la Nobilità della Pittura e della Scultura, per Nicolas Passeri. Napoli, 1783, 8vo.

SPANISH.

Arte dei Pintura, Symmetria y Perspectiva, por Phil. Monnez. Lisbon, 1615, 4to.

Memorial Informatorio, por los Pintores. Madrid, 1629, 4to.

Dial. de la Pintura, su Defensa, Origen, Essencia, Definicion, Modos, y Differencias, por Vinc. Carducho, Firent. Madrid, 1633 and 1637, 4to.

Trattato de la Pintura, su antiguedad y grandezas, por Franc. Pacheco. Seville, 1649, in 4to.

El Museo Pintorico, y escala Optica, por Ant. Palamino Velasco. Madrid, 1715, 1724, three vols. fol.

La Pittura, Diego Ant. Regon De Silva. Segovia, 1788; a poem in three cantos.

Discorsos apologeticos en que se defiende la Ingenuidad del Arte de la Pintura, que es liberal y noble de todos Derechos, por Juan de Butron. Madrid, 1626, 4to.

Por el Arte de la Pintura, por D. Juan Xanregui. Madrid, 1633, 4to.

FRENCH.

Idée de la Perfection de la Peinture démontrée par les principes de l'Art et par des Exemples conformes aux Observations que Pline et Quintellien ont faits sur les plus célèbres Tableaux des Anciens Peintres, mis en Parallèle avec quelques Ouvrages de nos meilleurs Peintres modernes, Lion. da Vinci, Raffaelle, Jules Romain, et Le Poussin, par Roland Freart, Sieur de Chambray, au Mans, 1662, 4to; Paris, 1672, 8vo.

La Peintre converte aux Règles précises et universelles de son Art, avec un Raisonnement au Sujet de Tableaux, Abr. Bosse. Paris, 1667, 4to.

Des principes de l' Architecture, de la Peinture et de Sculp-

ture, et des autres Arts qui en dépendent, avec un Dictionnaire propre à chacun de ces Arts, par André Felibien. Paris, 1669, 1697, 4to.

Conférences de l'Académie royale de Peinture et de Sculpture pendant l'Année, 1667. Paris, 1669, 4to.; Amst., 1706, 12mo.; and in the fifth vol. of Entretiens sur les vies des Peintres, by the same. Trev., 1725, 12mo.

Traité de la Pratique de la Peinture, par Phillipe de la Hire, in l'Histoire de l'Académie des Sciences de Paris, 1666—1669, vol. ix., p. 635.

L'Académie de la Peinture nouvellement mise au jour pour instruire la Jeunesse à bien Piendre en Huile et en Miniature, par La Fontaine. Paris, 1679, 12mo.

Conférence de l'Académie, avec les Sentimens des plus habiles Peintres sur la Pratique de la Peinture et de la Sculpture, avec plusieur Discours académiques, par Henri, Testelin. Paris, 1696, fol.

Livre de Secrets pour faire le Peinture, 1682, 12mo.

Cours de Peinture par principes, M. Roger de Piles. Paris, 1708, 1720, 12mo. This forms the second vol. of his Œuvres diverses. Amsterdam, 1766, 12mo.

Elémens de la Peinture-pratique, by the same. Paris, 1684, 12mo.; 1708, 12mo. Ch. Ant. Jombert has given an enlarged edition of it, 1766, 8vo., which forms the third vol. of the Œuvres diverses, Amster., 1766, 12mo. This work has been erroneously attributed to Jean Baptiste Corneille.

Traité sur la Peinture, pour en apprendre la Théorie et se perfectionner dans la pratique, par Barnard Dupui Du Grez. Toulouse, 1699, 4to.

Réflexions sur la Poésie et sur la Peinture, Abbé Jean Baptiste Dubos. Paris, 1719, two vols., 12mo. Enlarged editions in 1733, and 1740, three vols., 12mo.

Discours prononcés dans les Conférences de l'Académie royale de Peinture et de Sculpture, by Antoine Coypel. Paris, 1721, 4to.

Dialogues sur la Peinture, by Fenelon. They are joined to the Life of Mignard, by the Abbot Monville. Amst., 1731, 12mo.

In the Choix de Mercures, vol. ii., p. 167, is a letter upon painting, by M. Brossard de Mantenei: Observations sur la Peinture. London, 1736, 8vo.

Réflexions sur la Peinture, by M. de la Font De Saint Yenne. 1746, 12mo.

Letters sur la Peinture, à un Amateur, par Louis Guillaume Baillet de Saint Julien. Genève, 1750, 12mo.

Essai sur la Peinture, Sculpture, et Architecture, Louis de Bachaumont. Paris, 1752, 8vo.

Jaq. Gautier, Observations sur la Peinture et sur les Tableaux anciens et modernes, by the same. Paris, 1753, two vols., 12mo.

In the Recueil de quelques Pièces concernant les Arts, by Cochin, Paris, 1757, 12mo, p. 121, is a Mémoire sur la Peinture, which had already appeared in Mercure de France.

Discours sur la Peinture et sur l'Architecture, by M. du Perron. Paris, 1758, 8vo.

Réflexions sur les différentes Parties de la Peinture, is to be found with l'Art de Peindre, Watelet. Paris, 1769, 4to; 1761, 12mo.

In L'Amateur; ou, Nouvelles Pièces et Dissertations pour servir au Progrès du Goût et des Beaux Arts, Paris, 1762, 8vo, are some reflections upon colours.

Traité de la Peinture, suivi d'un Essai sur la Sculpture, pour servir d' Introduction à une Histoire universelle relative à ces beaux Arts, by André Bardon. Paris, 1765, two vols., 12mo.

Observations Raisonnées sur l'Art de la Peinture, appliquée à la Galérie de Dusseldorf, by Fredon de la Bretonierre. Dusseldorf, 1776, 4to.

Principes abrégés de Peinture, par M. Dutems. Tours, 1779, 8vo.

Traité des Principes et des Règles de la Peinture, by M. Liotard. Genève, 1781, 8vo.

Réflexions sur la Peinture et la Gravure, by C. F. Joullain. 1785, 12mo.

Bibliotheq. des Artistes et des Amateurs. Abbé Jean Raymond de Petitz. 1766, three vols., 4to.

Many French didactic poems have been written on painting; such are :—

La Peinture, 1755, 12mo.

L'Art de Peinture, Watelet. Paris, 1769, 4to; Amst., 1671, 12mo.

La Peinture, a poem, crowned at the Floral Games in 1767. M. Mich. d'Avignon. Lyons, 12mo.

La Peinture, La Mierre. Paris, 1770, 4to.; Amst., 1770, 12mo.

Grand Livres des Peintres; ou, l'Art de la Peinture, considéré dans toutes ses Parties et démontré par Principes, avec des Réflexions sur les Ouvrages de quelques bons Maitres et sur les Défauts qui s'y trouvent, par Gerard de Lairesse. Paris, 1787, two vols., 8vo.

Eloge de la Peinture, par Philipe Angele. Paris, 1642, 12mo.

Ichnographie; ou, Discours sur les quatre Arts d'Agriculture, Peinture, Sculpture et Gravure, avec des Notes historiques, cosmographiques, chiffres, Lettres initiales, Logogriphes, &c., M. Hebert. Paris, 1767, five vols., 12mo.

ENGLISH.

A proper treatise, wherein is briefly set forth the art of Limning. London, 1625, 4to.

Ars Pictoria; or, an Academy treating of Drawing, Painting, Limning, and Etching; to which are added thirty copperplates, expressing the choicest, neatest, and most exact grounds and rules of symmetry, collected out of the most eminent Italian, German, and Netherland authors, by Alex. Brown. London, 1660, 8vo; 1669 and 1675, small fol.

Introduction to the general Art of Drawing and Limning. London, 1674, 4to.

Painting Illustrated in Three Dialogues, containing some choice Observations upon the Art; together with the Lives of the most eminent Painters, from Cimabue to the time of Raffaelle and Michel Angiolo, with an explanation of the difficult terms. London, 1685, 4to; 1719, 4to; 1785, 4to, by

Will. Aglionby, and the Lives of Painters are corrected after Vasari.

Polygraphice; or, the Art of Drawing, Engraving, Etching, Limning, Painting, Washing, by Salmon. London, 1678, two vols., 8vo; 1701, two vols., 8vo.

The Art of Painting of the best Italian, French and German Masters. London, 1692, fol.

Art of Painting in Oil, and Method of Colouring, by J. Smith. London, 1753, 12mo.

Art of Painting after the Italian Manner, by M. Elsum. London, 1704, 8vo.

Essay upon the Theory of Painting, by Richardson. London, 1719, 8vo; forming the first vol. of a Treatise on Painting, translated into French by A. Rutgers. Amst., 1728, 8vo., four parts in three vols.

The Art of Drawing and Painting in Water Colours, by J. Smith. London, 1730, 1732, 1757, and 1779, 12mo.

Essay upon Poetry and Painting, with relation to the sacred and profane History, by Charles La Motte. London, 1739, 12mo.

The Principles of Painting. London, 1744, 8vo.

Polymetis; or, An Inquiry concerning the Agreement between the Roman Poets and the Remains of the Artists, by John Spence. London, 1747, 1755, and 1774, fol. Tindal has given an abridgment of it, London, 1765, republished in 1786, 8vo.

Plan of an Academy of Painting, Sculpture, &c. London, 1755, 4to.

Practice of Painting and Perspective; in which is contained the Art of Painting in Oil, with the method of Colouring; first painting or Dead-Colouring; second painting; third or last painting, Painting Backgrounds, Copying, Drapery, and Landscape Painting, by Th. Bardwell. London, 1756, 1773, and 1782, 4to.

Inquiry into the Beauties of Painting, and into the merit of the most celebrated painters, ancient and modern, by Dan. Webb. London, 1777, 4to.

A Letter on Poetry, Painting, and Sculpture, by King. London, 1768, 12mo.

Seven Discourses delivered in the Royal Academy, by the President Sir Joshua Reynolds. London, 1778, 8vo; a French translation was published in Paris, 1787, two vols., 12mo. Several other Discourses of Reynolds were afterwards published in his collected works. London, 4to, 1796, &c.

Sketches on the Art of Painting, by Talbot Dillon. 1782, 8vo.

The Artist's Repository and Drawing Magazine, exhibiting the principles of the polite arts in their various branches. London, 1784, 4to.

Some details upon painting are to be found in the Handmaid to the Arts, by M. Dossie. London, 1764, two vols., 8vo; also in the School of Arts. London, 1785, 8vo.

A poetical Epistle to an êminent Painter. 1778, 4to, by W. Hayley, Esq.

The Beauties of Painting, by Pollinger Robinson. 1783, 4to.

A Parallel between Poetry and Painting, Dryden. London, 1695, 4to; inserted as a preface to his translatiou of Du Fresnoy.

The Artist; a Collection of Essays on Art, by various English artists, edited and conducted by Prince Hoare, Esq. London, 1809, two vols., 4to.

The various editions of the Lectures of Reynolds, Barry, Fuseli, Opie, West, &c.

DUTCH.

In ley ding tot de hooghe School der Schilderkanst door Sam. Van. Hoogstraeten. Middelb, 1641, 4to.; Rotterdam, 1678, 4to.

Willh. Gære, Natuurligk en schilderkonstig Antwerp der Menschenkunde: leerende niet alleen de kennis van de Gestalte, proportie, Schoonheyd, Muskelen, Bewegingen, Acteen, Passien en Welstand des Menschenbeelden, tot de Teykenkunde, Schilderkunde, Beldhonwery, Botseer en Giet-Oeffening toe passen; maar ook hoe sich een mensch na deselve Regelen, in allerhand Doeningh van Gaan, Staan, Loopen, Torssen, Dragen, Arbeyden, Spreken en Andere gebeerden

bevallig en verstandelijk aanstelen zal. Amst., 1682, with many fine engravings.

Der leermeester der schilderkonst, eertyds in rym gestelt door Karel van Mender, weder aan't licht gegeeven en ontrymi'd door Wibrandus de Geest, Schilder. Leawarden, 1712, 8vo.

GERMAN.

Le Livre curieux des Arts à l'Usage des Peintres, Sculpteurs, et Orfèvres, par Henri Vogtheren. Strasburg, 1543, 4to.

Le Manuel des Arts de Sébald Beham, propre à apprendre à peindre et à dessiner d'après les véritables Proportions et Divisions du Cercle à l'Usage des Peintres et des Artistes. Francfort, 1605, 4to, with fifty-seven wood engravings.

L'Academia tedesca della Architettura, Scultura, e Pittura. Nurembourg, 1675, 1679, two vols., fol.

Le vrai chemin à suivre pour apprendre à peindre, par Guillaume Stettler. Berne, 1679, 12mo.

Le Peintre curieux. Dresden, 1679, 8vo, with engravings.

Le Peintre instruit, habile, galant, et édifiant, par J. Dauw. Copenhagen, 1721, 8vo; an enlarged edition by Charles Bertrand, ib., 1755, 8vo.

Principes de la Peinture et du Dessin, par Joseph Widtmaisser. Vienna, 1731, 4to.

Le Peintre justituteur, montrant aux Amateurs comment il faut s'y prendre pour apprendre à peindre en huile, en Pastel, en Fresque, &c., by Jean Melchior Croecker. Jena, 1778. 8vo.

Idées sur l'Imitation des Monumens Grecs en Peinture et Sculpture. Dresden, 1754 and 1756.

Epitre au Sujet de l'Ouvrage précédent. Dresden, 1755, 4to.

Dissertations upon the work: Idées sur l'Imitation des Monumens Grecs, ib., 1756, 4to.

Jean Winckelmann. La Manière d'apprendre à Peindre; Ouvrage dans lequel on montre l'Excellence et l'Utilité de

cet Art, l'Usage qu'on doit en faire, et comment on doit s'y perfectionner, &c. Leipsick, 1756, 8vo.

Réflexions sur la Peinture, by Chrétien Louis de Hagedorn. Leipsick, 1762, two vols., 8vo. Translated by Huber. Leipsick, 1775, 8vo.

Der Laocoon ; ou, des Limites respectives de la Poésie et de la Peinture, G. E. Lessing. Berlin, 1766. M. Charles, Vanderbourg, translated it into French. Paris, Renouard, 1802, 8vo.

Dissertations sur la Théorie de la Peinture et du Dessin, où on établit les vraies Principes propres pour former le Goût dans les Arts. Frankfurt et Leipsick, 1769, 8vo.

Sur la Nature et l'Art dans les Tableaux, la Sculpture, l'Architecture, et la Gravure. Leipsick, 1770, two vols., 8vo. Par Christophe Scheyb.

By the same author, Orestrio, sur les Arts du Dessin, avec un Appendix sur la Manière de faire des Empreintes en Souffre, Plâtre, et Verre, et graver en Pierres dures, &c. Vienna, 1764, two vols., 8vo.

Instruction sur l'Etude de la Peinture en tant qu'elle appartient aux Beaux Arts, et la Peinture comme métier, prouvée, d'une Manière pratique, par E. L. D. Huch. Halle, 1773, 8vo.

L'Etude du Dessin et de la Peinture, à l'Usage des Commençans, suivi d'une Liste des plus célèbres Peintres, Sculpteurs, et Architectes, amisi que des Académies et Ecoles, par Chrétien Louis Reinhold. Goetingen, 1773, 8vo, with forty-five engravings.

Système des Arts du Dessin, suivi d'une Introduction à l'Etude des Antiques, Hieroglyphes, et Attributs allégoriques modernes, by the same. Munster, 1784, 8vo, with forty engravings. A continuation and Supplement to this work, l'Ecole du Dessin et de la Peinture. Munster, 1786, 8vo, with forty-five engravings; and l'Académie des Beaux Arts, &c., with fourteen engravings. Munster, 1788, 8vo.

Principes de la Peinture, par Junker. Zurich, 1775, 8vo.

Académie des Arts du Dessin, par Chrétien Frédéric Prangen. Halle, 1788, 2 vols., 8vo,

Leçons sur les Arts du Dessin, destinès aux Eleves des

Académies ses Arts, par H. A. Martens. Leipsic, 1783, 8vo.

Instruction sur la Théorie et la Pratique du Dessin et de la Peinture, pour les Commençans de cet Art. Altona, 1778, 8vo, with engravings.

Bibliothèque des Arts destinée aux Peintres, Dessinateurs, Graveurs, et Sculpteurs, en Forme de Lettres, par C. Lang. Erlanger, 1779. Continued under the title of Lettres à l'Usage des Peintres, Dessinateurs, &c. Francf., 1791 et 1792, 2 vols., 8vo.

Magasin pour les Arts du Dessin. Munich, 1791, 8vo.

Théorie de la Peinture; ou, l'Instruction sur la Peinture d'Histoire à l'Usage des Commençans, par Christophe Fesel. Wurtzburg, 1792, 8vo.

Reply to the question: "Does Painting possess any Influence over a State?" Hamburgh, 1763.

Advice to Young Artists to apply themselves to Literature, by H. de Sonnenfels. Vienna, 1768, 8vo.

An Inquiry whether Painting produces a greater effect than Music. A Dialogue by Herder, among his Miscellaneous Works. Gotha, 1785, 8vo.

ON THE HISTORY OF PAINTING IN GENERAL.

Histoire des Arts qui ont rapport au Dessin, divisée en trois Livres, où il est traité de son Origine, de son Progrès, de sa Chute, et de son Rétablissemen, par Monier. Paris, 1705, 8vo.

The Perfect Painter; or, A History of the Origin, Progress, and Improvement of Painting. 1730, 12mo.

Introductio ad Historiam Artis Delineatoriæ, Peter Ciner, included in his Dissertationes Litterariæ. Florence, 1742, 8vo.

Essai d'une Histoire des Arts du Dessin, par A. F. Busching. Hamburg, 1671, 8vo.

Della Patria degli Arti del Designo del Gherardo d'Arco. Cremona, 1785, 8vo.

Anecdotes des Beaux Arts, contenant tout ce que la Peinture, la Sculpture, la Gravure, l'Architecture, et la Vie des Artistes offrent de plus curieux et de plus piquant chez tous

les Peuples du Monde, depuis l'Origine de ces différens Arts jusqu'à nos Jours. Paris, 1776, 8vo, three vols.

Domenico Manni, del vero Pittore Luca et del Tempo del suo fiorere. Florence, 1764, 4to.

Dell' Errore che persiste di attribuirsi le Pitture al. S. Evang. by the same author. Florence, 1766, 4to.

On the Origin, Antiquity, and History of Painting among Different Nations.

Joa. Nicolai Funeii, Diss. de Picturæ Usu et Origine, and Dissertationes academicæ. 1746, 8vo, pp. 470.

Lettere dell' Origine, Uso, ed Abuso della Pittura, in the Lettere scelto del Abbate Pietro Chiari. Venice, 1750, 8vo, pp. 172.

De l'Ancienneté de la Peinture, par Fraguier, in Vol. 1 of Mémoires de l'Académie des Belles Lettres.

On the Origin and History of the Art.

Studemund. Jena, 1767, 8vo.

On the State of Painting among the Greeks and Romans.

De l'Amour des Beaux Arts, et de l'extrême Considération que les Grecs avoient pour ceux qui les cultivoient avec Succés, Caylus, &c., in Vol. 21 of Mémoires de l'Académie des Belles Lettres.

Histoire de la Peinture ancienne, extraite de l'Histoire naturelle de Pline, avec le Texte Latin, corrigé sur les Manuscrits de Vossius et sur le prèmiere Edition de Venise, et traduite en François par D. Durano. London, 1725, folio.

The Treatise of Count de Caylus on the Pictures of Polygnotus; on Several Passages of Pliny relating to the Arts; on the Picture of Venus by Apelles, &c., in vols. 19, 27, 29, and 30 of Mémoires de l'Acad. des Inscriptions et Belles Lettres; may be recognized as a continuation of the former work.

The third and fourth parts of the work Gallus Romæ Hospes, par L. Mont Josieu, Rome, 1585, 4to (and to be found

in Vol. 9 of the Trésor of Gronovius), treat of Antique Sculpture and Painting.

De l'Origine de la Peinture et des plus excellens Peintres de l'Antiquité. Paris, 1660, 4to.

Des Peintres anciens et de leurs Manières, in Vol. 10 of Nouveaux Choix des Mercures. Joann. Fonseca, de Pictura Veterum. Dalle Pittura Antica, da G. B. Bellori. Venice, 1697, 4to.

Treatise on Ancient Painting, containing Observations on the Rise, Progress, and Decline of that Art among the Greeks and Romans, by George Turnbull; adorned with fifty pieces of ancient Painting discovered in the ruins of old Rome, accurately engraved from drawings of Camillo Paderni. London, 1740, folio.

Inquiry into the Causes of the Extraordinary Excellency of Ancient Greece in the Arts. London, 1767, 8vo.

In the Archæologia Litteraria of Ernesti, in that of Martini, and in that of Siebenkeer, are chapters on Painting among the Ancients.

Sur la Peinture des Anciens, par Falconet, in Vol. 6 of his works. Lousanne, 1781.

Recherches sur l'Origine, l'Esprit, et le Progrès des Arts de la Grece, sur leur Connexion avec les Arts et la Religion des anciens Peuples de l'Inde, de la Perse, du reste de l'Asie, de l'Europe, et de l'Egypte. London, 1785, 4to.

Sur la Peinture des Anciens, servant de Supplément à l'Historie de l'Art, par A. Riem. Berlin, 1784, 4to.

Observations on the Art of Painting among the Ancients, by Cooper, in Vol. 3 of the Memoirs of the Literary and Philosophical Society of Manchester. 1790, 8vo.

Works on the Lives of Painters.

Entretiens sur les Vies et sur les Ouvrages des plus excellens Peintres, anciens et modernes, André Felibien. Paris, 1696, five vols., 4to, and London, 1705, four vols., 8vo.

Part 2 of Vol. 1 of the Academia tedesca della Architettura, Scultura, e Pittura, Sandrart. Nuremberg, 1675, folio.

Noms des Peintres les plus célèbres, anciens et modernes. Paris, 1769, 12mo.

Abrégé de la Vie des Peintres avec des Réflexions sur leurs Ouvrages par R. De Piles. Paris, 1747, 12mo.

Abecedario Pittorico, e sia serie degli nomini i più illustri in Pittura, Scultura, ed Architettura, da F. P. A. Orlandi. Bologna, 1704, 4to.

Account of the most eminent Painters, ancient and modern, continued down to the present times according to the order of their succession, by R. Graham. London 1716, 8vo.

Table Historique et chronologique des plus fameux Peintres anciens et modernes, par A. F. Harms. Brunswick, 1742, folio.

Dictionnaire générale des Artistes, Fuseli. Zuric, 1767, 4to.

Extraits des différens Ouvrages publié sur la vie des Peintres, by M. Papillon de la Ferte. Paris, 1776, 12mo.

Pet. Opmerii Opus Chronmogr. Orbis universi a Mundi Exordio usque ad annum 1611. Antwerp, 1611, folio.

Viti de' Pittori antichi, scritte ed illustrate da Carlo Dati, 1677, 4to. Lezione detta nella Academia della Crusca intorno a' Pittori, Greci e Latini, de Filippo. Baldinucci, 1692, 4to.

There is a catalogue of the Painters and other Artists of Antiquity in Vol. 10 of Junius's work, De Pictura Veterum. Rotterdam, 1694.

L'Académie des Sciences et des Arts, contenant les Vies et les Eloges des Hommes illustres, par J. Bullart. Brussels, 1695, folio.

Le vite de' Pittori, de Scultori, a degli Architetti moderni, con loro Ritratti al naturale, da Giovanni Pietro Bellori. Rome, 1672, 4to.

Accresciuta colla Vita e Rittrato del Car. Luc. Giardano. Rome, 1728, 4to.

Vite de Pittori, Scultori, ed Architetti moderni da Lione Pascoli. Rome, 1730-6, two vols., 4to.

Portraits of the most eminent Painters and other famous Artists that have flourished in Europe, curiously engraved on

above one hundred copper-plates, from original Paintings of Van Dyck, Jansens, Guido, Teniers, and other celebrated Masters; with an Account of their Lives, Characters, and most considerable Works. London, 1739, 4to.

Abrégé de la Vie des plus fameux Peintres, avec leurs Portraits gravée en taille-douce, les Indications de leurs principaux Ouvrages, quelques Réflexions sur leurs Charactères et la Manière de connoitre les Dessins et les Tableaux des grands Maitres, par M. A. J. Dezallier d'Argensville. Paris, 1745, three vols., 8vo.

The Gentleman and Connoisseur's Dictionary of Painters, containing a Complete Collection and Account of the most distinguished Artists, who have flourished in the Art of Painting in Europe, from 1250 to 1767; to which is added a Catalogue of the Disciples of the most famous Masters, &c. Pilkington, London, 1767, 4to.

Dictionnaire des Artistes, par M. l'Abbé L. A. Fontenay. Paris, 1776, two vols., 8vo.

Biographical Memoirs of Extraordinary Painters, exhibiting not only Sketches of their principal Works and professional Characters, but a variety of romantic Adventures and original Anecdotes. London, 1780, 12mo.

Abrégé de la Vie des Peintres, dont les Tableaux composent la Galerie Electorate de Dresde. Dresden, 1782, 8vo.

Manuale de' Pittori 1792. Florence, 8vo.

Museo Fiorentino, che contiene Iritratti de Pittori. Firenze, 1742, large fol., with engravings.

ON TASTE.

Riflessione sopra il buon Gusto, intorno le Scienze e le Arti. Venice, 1708 and 1717.

L. A. Muratore published under the fictitious name of Lamindo Pritanio, a Discourse on the Actual State of the Spaniards in Literature, Juan Sempre y Guarinos, Madrid, and in the first vol. Della perfetta Poesia.

Mademoiselle Dacier has a digression upon Taste, at the commencement of a translation of certain Comedies of Aris-

tophanes, which she defines, The Harmony or Agreement between Wit and Reason.

The Entretiens Galans (3rd) likewise treats of the same subject, styling it the Clearness of the Reasoning Faculty inciting to a just choice the Enthusiasm of the Heart.

Lettres sur le bon Goût, sur les Moyens de le regler, et sur les Différences du Goût, by the Abbé Bellegarde, in his Lettres curieuses de Littérature et de Morale, and in his Lettres Choisies de M. M. de l'Académie Franç. Paris, 1708, 12mo.

Manière de bien penser dans les Ouvrages d'Esprit, Père Bonhours. Paris, 1684, 4to, and 1771, 12mo.

Discours sur le bon Goût by J. F. Du Tremblay. Paris, 1713, 12mo.

Réflexions générales sur le Goût, by Rollin, in his Manière d'enseigner et d'étudier les Belles Lettres.

Essai historique et philosophique sur le Goût, by Cartaud de la Vilate. Paris, 1736 and 1751.

Batteaux, in Vol. 1 of his Cours de Belles Lettres.

Lettre de J. B. de la Carne de Sainte-Palaye, to M. Bachaumont, sur le bon Goût dans les Arts et dans les Belles Lettres. Paris, 1751.

The article Goût in the French Encyclopædia, by Voltaire.

Réflexions sur l'Usage, et sur l'Abus de la Philosophée en Matière de Goût, in Vol. 4 of D'Alembert's Melanges.

L'Art de sentir et de juger en Matière de Goût, by the Abbé Seran de la Tour. Paris, 1762.

Discours et Réflexions sur le Goût, by Tormey; in his Essais sur le Beau. Amst., 1764.

Dissertation sur le Goût, by Le Cat, in the New Memoirs of the Academy of Berlin.

Of German authors, Thomasius was the first who wrote on Taste.

On the Influence and Use of the Imagination, and on the perfecting of Good Taste, by J. J. Bodmer. Frankfort, 1727.

De Morum Vi ad Sensum Pulchritudinis, quam Artes sectantur, auctore Chr. Gottl. Heyne. Gottingen, 1763.

Treatise on the Influence of Manners upon Language and Good Taste, by G. I. Findeisen. Berlin, 1768.

In the Revision of German Literature is a Treatise on the Taste of the Present Day. Manheim, 1776.

Philosophy of the Fine Arts, Kœnig. Chap. xix. treats principally of Taste.

In the Theory of the Fine Arts, Schott, there is a chapter on Taste.

The third vol. of Criticism on the Faculty of the Judgment, by I. Kant, is almost entirely on the same subject.

Of the Standard of Taste; and of the Delicacy of Taste, in the Essays and Treatises of Hume.

Letters concerning Taste, Cooper. London, 1753.

Essay on Taste, by Alex. Gerard. Edinburgh, 1789.

Clio, a Discourse on Taste. London, 1766.

A Treatise on the Origin of our Ideas of the Sublime and the Beautiful, in the Philosophical Inquiries of Harris. London, 1772.

Zœlia and Hortensia; or, Thoughts on Taste and Genius. Edinburgh, 1782.

Of Taste and its Improvements, in Beattie's Dissertations Moral and Critical. London, 1783.

Essay on the Taste for the general Beauties of Nature, and Essay on a Taste for the Fine Arts, by T. Percival, in his Moral and Literary Dissertations. London, 1784.

The seventh section of Essays on the Intellectual Power of Man. Reid, Edinburgh, 1785.

Attempt to show that a Taste for the Beauties of Nature and the Fine Arts has an influence favourable to Morals, by S. Hall; and another tract, on the Pleasure which the Mind receives from the Exercise of Taste in particular, by C. Pollier, in the second vol. of Memoirs of the Literary and Philosophical Society of Manchester. London, 1785.

The Discourses of Sir Joshua Reynolds—Inquiry into the Principles of Taste and the Origin of our Ideas of Beauty. London, 1790.

Essays on the Nature and Principles of Taste, by A. Alison. London, 1790.

Esprit des Beaux Arts; or, Histoire Raisonée du Goût, by P. Esteve. Montpellier, 1753, two vols., 12mo.

Causes of the Decline of Taste among different Nations, in German, Herder, Berlin. 1775.

Del Gusto presente nella Litteratura Italiana, Dissert. del D. Matteo Borsa, accompagnato da copiose Osservazione da Stef. Arteaga. Venice, 1784.

Discorsa sul Gusto presente della Bella Lettere d' Italia, J. Pindemonte, to be found in his Volgaritz dell' Inno a Cerere. Bass., 1785.

Dell Carattere nazionale del Gusto Italiano. Milan, 1785.

Lettres sur la Naissance, le Progrès, et la Décadence du Goût en France, by Rimond Sant-Mard, in his Réflexions sur la Poésie. Paris, 1733.

Quelles sont les Sources de la Décadence du Goût? by the Abbé Laserre. Nismes, 1768.

L'Idea del perfetto Pittore, per servire de Regola nel Giudizio che si deve formare intorno all' Opere de' Pittore. Venice, 1771, 4to.

Dell' arte di vedere nella belli Arti del Disegno, secondo li principi de Sulzer, e de Mengs. Venice, 1781.

Sentimens sur la Distinction des diverses Manières de Peinture, Dessin, et Gravure, et des Originaux d' avec leurs copies, Bosse. Paris, 1649, 8vo.

Conversations sur la Connaisance de la Peinture, et sur le Jugement qu'on doit faire des Tableaux, De Piles. Paris, 1677.

Manière de bien juger des Ouvrages de Peinture, by the Abbé Zaugior. Paris, 1771.

Two Discourses and Essays on the whole Art of Criticism, as it relates to Painting, and in behalf of the Science of a Connoisseur, by Richardson. London, 1719.

Thoughts on Beauty and Taste in Painting (German), Winckelmann. Zurich, 1762.

Dictionnaire des Beaux Arts, Sulzer; also under the same title by Millin; Dictionary of Painting, by Watelet, &c.

LEXICONS AND DICTIONARIES.

Dictionnaire abrégé de Peinture, et l'Architecture, où l'on trouve les princepaux Termes de ces deux Arts, avec leur Explication, la Vie abrégé des grands Peintres et des Architectes célèbres, et une Description succinte des plus beaux Ouvrages de Peinture, de Sculpture, et d'Architecture, soit antiques, soit modernes, par l'Abbé Marsy. Paris, 1746, two vols., 8vo.

Dictionnaire portatif des Beaux Arts, par Lacombe. Paris, 1766, 8vo.

Dictionnaire portatif de Peinture, Sculptures, Estampes, par M. Prezel. Gotha, 1758, 8vo.

Dizionario portatile delle Belle Arti, che contiene quanto é di piu remarchevole nella Pittura, Scultura, Intaglio, &c., collu Vita de' più celebri Professori della medisime Arte. Venezia, 1758, 8vo.

Nouveau Dictionnaire des Peintres, pour acquérir une Connoisance exacte des bons Tableaux anciens et modernes, avec un Appendix de quelques Nonogrammes, par Louis de Winckelmann. Aug., 1796, 8vo. (German).

Dictionnaire des Arts de Peinture, Sculpture, et Gravure, par Watelet et Levesque, Paris, 1792, five vols., 8vo.

Théorie genérale des beaux Arts, rédigée par Ordre alphabétique, par J. G. Sulzer. Leipsic, 1793, four vols., 8vo. (German.)

PRESERVATION OF PICTURES.

Recueil des Mèmoires et diverses Expériences, faites un sujet de la Conservation des Tableaux, avec un Discours sur l'Incorruptible, par G. Dagly. Berlin, 1706, 8vo.

III.

LIST OF PAINTERS.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Giovanni Cimabue	Certain Greeks . . .	History . . .	1302	60	Revived painting.
Andrea Tassi	Apollonius, a Greek .	Do. . . .	1294	81	Revived mosaic.
Giotto	Cimabue	Do. . . .	1336	60	Quitted the conventional Greek manner.
Buonamico Buffalmacco . . .	Andrea Tassi	Do. . . .	1340	78	
Ambrogio Lorenzetti	Giotto	Do. . . .	1350	83	
Pietro Cavallini	Giotto	Do. . . .	1364	85	
Simone Memmi	Giotto	Portraits . . .	1345	60	
Andrea Orcagna	Imitated Giotto . . .	History . . .	1376	60	
Tommaso Giottino	Imitated Giotto . . .	Do. . . .	1356	32	
Paolo Uccello	Antonio Veneziano . .	Perspective, birds, &c.	1479	83	First who studied perspective.
Massolino	Lorenzo Ghiberti and Gher. Starnina	History . .	1418	37	Gave more grace to his figures and drapery.
Masaccio	Massolino	Do. . . .	1429	24	
Fra. Giov. Angelico da Fiesole .	Giottino	Do. . . .	1455	68	
Antonello da Messina	John Van Eyck . . .	Do. . . .	1495	49	Introduced oil-painting into Italy.
Fra. Filippo Lippi	Masaccio	Do. . . .	1469	69	Began to paint figures larger than life.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Andrea del Castagno, detto Degl' Impiccati	Dominico Veneziano .	History . . .	1480	71	Painted in oil first at Florence.
Gentile da Fabriano	Giov. da Fiesole . . .	Do. . . .	1412	80	
Giacomo Bellini	Gentile da Fabriano .	Do. . . .	1470	...	
Gentile Bellini	Giacomo, their father .	Do. . . {	1501	80	
Giovanni Bellini			1516	90	
Cosimo Rosselli	.....	Do. . . .	1507	68	
Dominico Ghirlandajo . . .	Allessand. Baldovinetti	Do. . . .	1493	44	Good colour and design.
Andrea Verocchio	Giacomo Squarcione .	Do. . . .	1488	56	Observation of perspective.
Andrea Mantegna	.....	Do. . . .	1506	66	
Filippino Lippi	His Father and Sandro Botticelli	Do. . . .	1505	69	
Pietro Perugino	Andrea Verocchio . .	Do. . . .	1524	58	
Bernardino Pinturicchio . . .	Pietro Perugino . . .	Do. . . .	1513	59	
Francesco Francia	Marco Zoppo	Do. . . .	1518	68	Chaste design, beautiful expression.
Bartolommeo Ramenghi, detto Il Bagnacavallo	Francesco Francia . .	Do. . . .	1541	48	
Innocenzo Francucci, detto da Imola	Francesco Francia . .	Do. . . .	...	...	
Francesco Turbido, detto Il Mauro	Giorgione	Portraits . . .	1521	81	
Luca Signorelli	Piet. del Francesca . .	History . . .	1521	82	

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Leonardo da Vinci	.....	History and portraits	1519	67	Noble design, careful modelling.
Giorgio Barbarelli, detto Giorgione	.....	Do. do.	1511	33	Fine colour and light and shade.
Antonio Allegri da Corregio .	.....	Do. do.	1534	40	Airiness of colour.
Mariotto Albertinelli	Cosimo Rosselli . . .	History . . .	1520	45	
Baccio della Porta, detto Fra. Bartolomeo di S. Marco	Cosimo Rosselli . . .	Do. . . .	1517	48	
Pietro di Cosimo	Cosimo Rosselli . . .	Grotesque . .	1521	80	
Raffaellino del Garbo . . .	Filippo Lippi	History . . .	1529	58	
Michelangelo Buonarroti . . .	Dom. Ghirlandajo . .	Do. . . .	1564	90	
Raphael Sanzio d'Urbino. . .	Pietro Perugino . . .	Do. and portraits	1520	37	Just thought and composition.
Titiano Vecelli	Giovanni Bellini . . .	Do. do.	1576	99	Picturesque composition, magnificent colour.
Dominico Puligo	Dom. Ghirlandajo . .	History . . .	1525	52	
Timotio della Vite da Urbino .	Raffael	Do. . . .	1524	54	
Vicenzo da San Geminiano . .	Do.	Do. . . .	1527	52	
Lorenzo di Credi	Andrea Verocchio; imitated da Vinci	Do. . . .	1530	...	
Balthazar Peruzzi	.....	History and buildings	1536	55	
Giov. Francesco Penni, detto Il Fattore	Raffael	History . . .	1528	40	Imitated his master—rapid execution.
Guilio Romano	Do.	Do. . . .	1546	54	Bold composition.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Pelegrino da Modena	Raffael	History . . .	1538	...	
Pierino Buonacorsi, detto Perin del Vago	Do.	Do. . . .	1547	47	
Giovanni da Udine	Do.	Grotesque . .	1564	70	Animals, fruit, and flowers.
Andrea del Sarto	Pietro di Cosimo . .	History and portraits	1530	42	Fine colour.
Francia Bigio	Mariotto Albertinelli .	History . . .	...	41	Painted with and like Andrea.
Sebastiano Luciani, detto Fra. Seba. del Piombo	Giov. Bellini, Il Giorgione, M. Angelo	History and portraits	1547	62	Severe design.
Orazio Sammachini	Il Bagnacavallo, Innocenzo d'Imola . . .	History . . .	1577	45	
Lorenzetto Sabattini	Do. do. . . .	Do. . . .	...	...	
Prospero Fontana	Do. do. . . .	History and portraits	...	...	
Lavinia Fontana	Prospero, her father .	Do. do.	1602	50	
Pelegrino Tibaldi	Il Bagnacavallo Innocenzo d'Imola	History . . .	1592	70	Bold manner.
Primaticcio, detto Il Bologna .	Do., Guilio Romano	Do. . . .	1570	80	
Nicolo Bolognese, detto Messer Nicolo	Primaticcio	Do. . . .	1372	60	
Il Dosso	Lorenzo Costa, Titian .	History and landscape	...	...	

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Bernazzano da Milano . . .	.....	Animals, landscape, fruit	1550	...	
Giov. Martino da Udine . . .	Giov. Bellini	History . . .	1564	70	
Pelegrino da San Danielo . .	Do.	Do. . . .	1564	70	
Giov. Ant. Regillo, detto Licinio da Pordenone	Giorgione	History and portraits	1540	56	Fine colour.
Girolamo da Treviso	.....	History and buildings	1544	36	
Polidoro da Caravaggio . . .	Raffael	History . . .	1543	51	Monochromes.
Il Matorino	Raffael	Do. . . .	1527	37	Ditto.
Franc. Maria Mazzola, detto Il Parmigiano	Imitated Raffael . .	Do. . . .	1540	36	Graceful design, good colour.
Girolamo Mazzuoli	Francesco, his cousin .	Do. . . .	...	...	Imitated his master.
Giacomo Palma, detto Il Vecchio	Titian and others . .	History and portraits	1596	48	Good colour.
Lorenzo Lotto	Imitated Bellini and Giorgione	Do. do.	1544	36	
Francesco Monsignori	Bellini	Portraits . . .	1519	64	
Dominico Beccafumio Meccarino	Imitated Pietro Perugino	History . . .	1549	65	
Giacomo Pontormo	Leonardo da Vinci, Albertinelli, Andrea del Sarto	Do. . . .	1558	65	
Girolamo Genga	Pietro Perugino . . .	Do. . . .	1551	75	
Giov. Antonio da Vercelli, detto Il Sodona	.....	Do. . . .	1554	...	
Bastiano Aristotile	.....	Do. . . .	1551	70	

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Benvenuto Tisio, detto Garofalo	Baldini, Lorenzo, Costa	History . . .	1559	78	Raffaelesque.
Girolamo da Carpi	Garofalo ; he imitated Correggio	Do. . . .	1556	55	
Giov. Francesco Bezzi, detto Il Nosadella	Pelegrino Tibaldi . .	Do. . . .	1571	...	
Ercole Procaccini	Do.	Do. . . .	...	...	
Bartolomeo & trefigli Passerotti	Do.	Do. . . .	...	...	
Francesco Salviati	Andrea del Sarto . .	Do. . . .	1563	54	
Giorgio Vasari	Do.	History and portraits	1584	68	
Daniele Ricciarelli, detto Da Volterra	Il Sodona, Baldasar Peruzzi	History . . .	1566	57	Strongly marked character.
Taddeo Zucchero	Studied Raphael . . .	History and portraits	1566	37	
Frederico Zucchero	.....	Do. do.	1609	66	
Bartolomeo Cesi	Il Nosadella	History . . .	...	79	
Dionigi Calvart	Prospero Fontana . .	Do. . . .	1619	54	
John of Bruges	Hubert Van Eyck . .	History and portraits . . .	1470	...	Said to have invented oil-painting.
Albrecht Dürer	Martin Hüpsh . . .	Do. do.	1528	57	Fertility of invention, minute imitation under a Gothic bias.
Quintin Matsys, called The Smith of Antwerp	.....	Do. do.	1530	69	Minute imitation, quaint manner.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Lucas Jacob, called Lucas d'Ollanda	Cornelius Engelhert .	History and portraits	1533	...	
Peter Brueghel, called Old Brueghel	Peter Koek	...	1570	69	
John Holben, called Hans Holbein	.....	History and portraits	...	46	Truthfulness, minute drawing.
Roger Vander Wayden . . .	John Van Eyck . . .	History . . .	1529	...	
John Schorel	Jacob Cornil	Do. . . .	1562	67	
Matthias Cock	.....	Landscape . .	1465	65	
Martin Heemskerke	John Schorel	Droll figures .	1754	76	
François Floris, called Franc Flore	Lambart de Liege . .	History . . .	1570	50	
Francesco Vecelli	Titian, his brother . .	Portraits . . .	1579	66	
Orazio Vecelli	Titian, his father . .	History,portraits	...	...	
Nadalino di Murano	Titian	Portraits . . .	1588	75	
Damiano Mazza	Do.	History and portraits	...	...	
Girolamo di Titiano	Do.	Do. do.	...	...	
Paris Bordone	Do.	Do. do.	1571	70	Good colour.
Andrea Schiavone	Do.	History . . .	1582	60	
Alessandro Bonvicino, detto Il Moretto	Titian, imitated Raffael	Do. . . .	1564	50	
Girolamo Romani, detto Il Romanino	Titian	Do. . . .	1560	80	
Il Muttano	Titian, Tad, Zucchero .	Landscape and portraits	1590	62	

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Piero Ligorio.	Guilio Romano . . .	Antique monuments and buildings	1573	80	
Dom. Guilio Clovio . . .	Do. . . .	Illuminations .	1578	80	Prince of illuminators.
Angelo Bronzino	Jacopo da Pantormo .	History, portraits	1572	69	
Alessandro Allori	Bronzino, his uncle . .	History . . .	1607	72	
Giacomo Sementi	Dionizi Calvart . . .	Do. . . .	1625	45	
Marcello Vanusto	Perin del Vaga . . .	Do. . . .	1576	61	
Marco Faënza	.....	Do. . . .	...	...	
Girolamo da Sermonetta . . .	Perin del Vaga . . .	Do. . . .	1550	46	
Battista Naldino	Il Bronzino	Do. . . .	...	...	
Nicolo del Pomerancio . . .	.....	Do. . . .	1626	74	
Jean Cousin	.....	Do. . . .	1589	...	Commonly upon glass.
Michael Coxis	Van Orlay, Raffael .	Do. . . .	1592	95	Careful, but quaint Gothic manner.
John Bol	.....	Miniature and landscape	1593	59	
Peter Porbus	.....	.....	1583	73	
Antony Moro	John Schoorel . . .	Portraits, history	1581	70	
George Hoefnagel	.....	Architecture and landscape	1600	...	
Camillo Procaccini	Ercole, his father; Prospero Fontana	History . . .	1626	80	Forcible manner.
Guilio Cesare Procaccini . . .	Do. do. . .	Do. . . .	1626	78	Ditto.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Jude Indocus Van Winghen .	Studied in Italy . . .	History . . .	1603	62	
John Strada	Do.	Battles, hunting	1604	68	
Bartholemew Sprangher . . .	.. ...	History . . .	1623	77	
Michael John Miervelt . . .	Ant. Blockland . . .	Portraits . . .	1641	73	
Paolo Cagliari, detto Paul Veronese	Antonio Badiglio . .	History and portraits	1588	58	Picturesque composition, splendid decorative colour.
Carlo Cagliari	Paolo, his father . . .	Do. do.	1596	26	Imitated his father.
Benedetto Cagliari	Do. . . .	Do. do.	1598	60	Ditto.
Gabriello Cagliari	Do. . . .	Do. do.	1631	63	Ditto.
Battista Zelotti	Ant. Badiglio ; worked with Veronese	History . . .	1592	60	
Jacopo da Ponte, detto Il Bassano	Francesco, his father ; Bonifaccio Venetiano; imitated Titian	Rustic figures, animals, portraits, history	1592	82	Fine colour.
Francesco Bassano	Giacomo, his father .	Do. . . .			Imitated their father's manner and copied his pictures.
Leandro Bassano	Do. . .	Do. . . .	1623	65	
Giambattista Bassano	Do. . .	Do. . . .	1630	60	
Girolamo Bassano	Do. . .	Do. . . .	1622	62	
Giacomo Robusti, detto Il Tintoretto	Titian	History and portraits	1594	82	Magnificent colour, fertile invention, &c.; dashing execution.
Marietto Tintoretto	Tintoret, her father .	Portraits . . .	1590	30	
Paolo Franceschi	Tintoret	Landscapes . .	1596	56	
Martin de Vos	Do.	Do. . . .	1604	84	
Johann Rottenhammer . . .	Do.	History . . .	1623	69	After Tintoret.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Paolo Farinato	Antonio Badiglio . .	History . . .	1606	84	
Mario Veccelli	Titian, his uncle . . .	.....	1611	66	
Livio Agresti	Perin del Vaga . . .	History . . .	1580	...	
Marco da Siena	Dan. Volterra . . .	Do. . . .	1567	57	
Giacomo Rocca	Do. . . .	Do. . . .	...	...	
Frederigo Baroccio	Studied Raffael . .	History and portraits	1612	84	Good drawing.
Il Cavalier Francesco Vanni .	Fred. Baroccio . . .	History . . .	1615	51	Good design, agreeable colours.
Michelangelo da Caravaggio .	Cav. d'Arpino . . .	Do. . . .	1609	40	Strong manner.
Ludovico Caracci	Prospero Fontana . .	Do. . . .	1619	64	Good design and colour.
Augustino Caracci	Ludovico, his cousin .	History,portraits and landscape	1601	43	Do.
Annibale Caracci	Do.	Do. do. do.	1609	49	Do.
Domenico Zampieri, detto Domenichino	The Caracci	History and portraits	1641	60	Completeness.
Guido Reni	Dionigi Calvart, The Caracci	Do. do.	1642	68	Graceful design, and airy, day-light effect of colour.
Cav. Giov. Lanfranco	The Caracci	History . . .	1647	66	
Francesco Albani	Dionigi Calvart, The Caracci	Do. . . .	1660	82	
Lucio Massari	The Caracci	Do. . . .	1633	64	

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Sisto Badalocchio	An. Caracci	History . . .	...	...	
Antonio Caracci	Annibale, his uncle . .	Do. . . .	1618	35	
Guiseppe Pini, detto Il Cavaliere d'Arpino	Raff. da Rheggio . .	Do. . . .	1640	80	Spirited composition.
Il Paduano	.....	Portraits . . .	...	...	
Il Cigoli	Andrea del Sarto . .	History . . .	1613	54	
Domenico Feti	Cigoli	Do. . . .	1624	35	
Cherubino Alberti	.....	Do. . . .	1615	63	
Cavalier Passignano	Fred. Zucchero . . .	Do. . . .	1638	80	
Orazio Gentileschi	Aurilio Lomi	Do. . . .	1647	84	
Filippo D'Angeli, detto Il Napolitano	.....	Landscape . .	1640	40	
Paul Brill	.....	Do. . . .	1626	72	Fine composition.
Matthew Brill	.....	Do. . . .	1584	34	
Pietro Paolo Gobbo	.....	Fruit and landscape	1640	60	
Il Viola	An. Caracci	Landscape . .	1622	50	
Roland Savari	Imitated Paul Brill . .	Do. . . .	1639	63	Fine finish.
Bartolomeo Manfredi	M. Ang. Caravaggio .	History . . .	...	...	
Carlo Saracino	Imitated Caravaggio .	Do. . . .	1625	40	
Il Valentino	M. Ang. Caravaggio .	Do. . . .	1632	32	
Guiseppe Ribera, detto Lo Spagnuoletto	Do.	Do. . . .	1656	67	Strong contrast of light and shade—appears to have sought the night-side of nature.
John Momp re	.....	Landscape . .	...	...	

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Hen. Cornelius Wroon (or Vroon)	Corn. Henrikson. . .	Seaports, ships .	...	...	
Agostino Tassi	Paul Brill	Sea-pieces, landscapes, &c. .	...	...	
Fra. Matteo Zaccolino . . .	.....	Perspective . .	1630	40	
Antonio Tempesta	John Strada	Battles, hunt., &c.	1630	75	
Octavius Van Veen, called Otho Vaennius	.....	History . . .	1634	78	
Jaen Le Clerc	Carlo Saracino . . .	Do. . . .	1633	...	
Simon Vouet	Laurent, his father . .	History and portraits	1641	59	
Pater Neefs	Henry Steinwick . .	Perspective . .	1651	85	
Henry Steinwick	John de Vries. . . .	Buildings, subjects illuminated by candle-light	1603	53	Skill in his speciality.
Theodore Rombouts	Abraham Jansens . .	Low life . . .	1640	43	
Gerard Seghers	Do.	.....	1651	62	Imitated M. A. Caravaggio.
Sir Peter Paul Rubens . . .	Otho Vaennius . . .	History, portraits, landscapes	1640	63	An exuberant style of composition and colour, combined with wonderful consistency—great in portraiture and landscape.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Sir Anthony Vandyck. . . .	Rubens	Portraits and history	1641	42	Masterly portraiture and fine colour.
Rembrandt Van Rÿn	J. Van Swanenburg .	History, portraits, &c.	1670	68	Masterly rendering of the effects of light and shade.
Cornelius Polenbourg . . .	A. Bloemart	Land. and figs. .	1660	74	Finished execution.
John Breughel, called Velvet Breughel	His father	Land., figures, flowers, &c.	1625	65	Extreme minuteness and finish.
Moses, called the Little . . .	Corn. Polenbourg . .	Landscape, figures, &c.	1650	...	
F. Dan. Legres	Young Breughel . .	Flowers . . .	1666	70	
Gaspar Craes	Coxis	.....	1669	84	
Bartholemew Briemberg . . .	Studied at Rome. . .	Landscapes . .	1660	40	
John Asselyn, called Little John	Esaias Vandervelde. .	Do. . . .	1660	50	
Francis Snyders	Painted with Rubens .	Animals . . .	1657	78	Bold style, masterly drawing of animals.
Ert Veest	.....	Naval engagements and tempests	1670	...	
Lewis Cousin	.....	.....	1670	...	
Philip Vauvremans (or Wouvermans)	John Wynants . . .	.....	1668	48	
Gerard Dow	Rembrandt	General . . .	1674	61	Fine finish.
Pietro Francesco Mola . . .	Cav. d'Arpino . . .	History . . .	1668	56	Strong manner.
Giov. Battista Mola	Albani	History and landscape	...	...	Do.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Giacomo Cavedone	Lud. Caracci	History . . .	1660	80	
Agostino Metelli	.....	Buildings . . .	1660	51	
Angelo Michael Collona . . .	Farantino	Architecture and history . . .	1687	87	
Giov. Benedetto Castiglione, detto Il Genoese	Pagi, Vandyck . . .	.....	...	...	
Pietro Testa	Domenichino	History, fanciful subjects	1650	39	Capricious design.
Matthew Platten, called Il Montagna	Asselyn	Sea-pieces . .	...	...	
Giov. Francesco Barbieri, detto Il Guercino da Cento	The Caracci	History . . .	1666	76	Sometimes strong effects, at others more moderate — very graceful.
Pietro Berretini, detto Pietro da Cortona	Baccio Ciarpi . . .	Do. . . .	1669	73	Good composition and colour.
Antonino Barbalonga	Domenichino	Do. . . .	...	...	
Andrea Camaceo	Do.	Do. . . .	1657	55	
Andrea Sacchi	Albani	Do. . . .	1661	72	Delicate and pleasing colours.
Simone Cantarini	Guido	Do. . . .	1648	36	
Cav. Carlo Cignani	Albani	Do. . . .	1719	91	Bold manner and bright colouring.
Pietro Facini	An. Caracci	Do. . . .	1602	42	

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Giov. Andrea Donducci, detto Il Masteletta	The Caracci	History . . .	1655	80	
Alessandro Tiarini	Prospero Fontana . .	Do. . . .	1668	91	
Lionello Spada	The Caracci	Do. . . .	1622	46	
Giov. Andrea Sirani	Guido	Do. . . .	1670	60	
Elisabetta Sirani	Her father	History and portraits	1664	26	
Giacomo Sementi	Guido	History . . .	1625	45	
Francesco Gassi	Do.	Do. . . .	...	...	Imitated his master.
Lorenzo Garbieri	Lud. Caracci	Do. . . .	1654	64	
G. Francesco Romanelli . . .	Pietro Costona . . .	Do. . . .	1662	45	
Don Diego Velasquez De Silva	Francesco Pacheco . .	Portraits, &c. .	1660	62	Wonderfully facile and good colouring—truthfulness of effect.
Alessandro Veronese	Felice Riccio	History . . .	1670	70	
Maria de Fiori	.....	Flowers . . .	1656	...	
Michelangelo del Campadoglio .	Fioravante	Flowers and fruit	1670	60	
Salvator Rosa	Spagnoletto and Daniel Falcone	Landscape . .	1673	59	Wild scenery: rock and glen, haunts of banditti.
Il Cav. Calabrese	Guercino	History . . .	1688	86	
Fer. Amola Fiovarenti . . .	.....	Still-life . . .	1512	...	
Il Matese	.....	Do. . . .	...	...	
Claude Gelee, called Claude de Lorraine	Godfrey Wals, Agostino Tassi	Landscape . .	1682	82	Romantic landscapes, bathed in sunlight.

Names.	Studied under.	Painted.	Died.	Age.	Excelled in.
Bartholome Esteban Murillo .	Juan del Castillo . .	History and portraits	1682	64	Fine colour and composition, with a naturalistic treatment of figures.
Nicholas Poussin	Quintin Varin . . .	History and landscape	1665	71	Classical manner, an antique bias.
Gaspar del Ghet, called Gaspar Poussin	Nicholas, his brother-in-law	Landscape . .	1675	...	Fine landscape.
Eustace le Sœur	Simon Vouet	History . . .	1655	38	Simple style, called the French Raffael.
Michelangelo del Battaglia . .	Mozzo of Antwerp . .	Battles . . .	...	...	
Jaques Stella	His father	History and miniatures	1647	51	Painted upon marble.
Carlo Maratti	Andrea Sacchi . . .	History . . .	1713	88	
Lucca Giordano	Lo. Spagnuoletto . .	Do. . . .	1705	76	
Charles le Brun	Simon Vouet and Nic. Poussin	Do. . . .	1690	71	Fertile in battle-pieces.
Cav. Giacinto Brandi . . .	Lanfranco	Do. . . .	1713	90	
Ciro Ferri	Pietro Cortona . . .	Do. . . .	1689	55	
Francisco Zuraban	Juan de Roélag . . .	Legendary . .	1662	64	Bold effects of chiaroscuro.

IV.

LIST OF THE PRINCIPAL EXISTING MURAL DECORATIONS.

NORTHERN ITALY.

Painters' Names.	Kind of Subject.	Locality.	Methods.
TURIN.			
.....	Religious . . .	Duomo	Fresco.
VERCELLI.			
Gaudenzio Ferrari . .	Devotional . .	St. Cristofero . .	Fresco.
NOVARA.			
Luini	Sacred and Legendary	Duomo	Fresco.
GENOA.			
Cambiaso	Mythological .	Palazzo M. Spinola	Fresco.
Perino del Vaga . . .	Historical . .	Do. Doria Panfili .	Do.
Taormino	Do.	Villa Cambroso .	Fresco.
Perino del Vaga . . .	Poetical . . .	Do.	Do.
.....	Religious . . .	Sant' Ambrogio .	Mosaic.
MILAN.			
Luini	Fanciful . . .	Sant' Ambrogio .	Fresco.
Gaudenzio Ferrari . .	Religious . . .	Do.	Do.
Calisto di Lodi . .	.....	Convent, Do. . .	Do.
Titian			
Gaudenzio Ferrari .	Religious . . .	Le Grazie . . .	Do.
Carlo di Crema . .			
Maleotto			
Leonardo da Vinci . .	The Last Supper	Refectory, Do. . .	Oil.
Luini	Religious . . .	San Maurizio . .	Fresco.
Gaudenzio Ferrari .			
Unknown, Early . .	Religious . . .	San Lorenzo . .	Mosaic.
Morazzone	Do.	Do.	Fresco.
PAVIA.			
Unknown	Fanciful . . .	Certosa	Fresco.
Bramante	Religious . . .	Do.	Do.
Antonio di Edessa . .	Do.	Duomo	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
PAVIA.—*con.*			
Guglielmo and Alberto di Lodi	Religious . . .	Duomo Lodi . .	Tempera.
CREMONA.			
Boccaccio Boccacini, and others	Legendary . .	Do.	Fresco.
Giulio Campi . . .	Religious . . .	San Nazzaro . .	Do.
Malosso			
MANTUA.			
Mantegna	.....	San Pietro . . .	Fresco.
Giulio Romano . .	Fanciful . . .	Palazzo del Fè . .	Do.
Primaticcio . . .			
Paolo Veronese . . .	Historical . .	Catajo. Battaglia .	Do.
BERGAMO.			
Luca Giordano . .	.....	Santa Maria Maggiore	Fresco.
Salmeggia			
Unknown, Ancient . .	.....	Santa Grate . .	Mosaic.
Padovanino . . .	Religious . . .	Sant' Andrea . .	Fresco.
Moretti			
BRESCIA.			
Bagnadore. . . .	Religious . . .	Sant' Afra . . .	Fresco.
Rossi.			
Sandrino	Do.	San Domenico . .	Do.
Fiaminghino . . .			
Giugno			
Gandino	Do.	San Guiseppe . .	Do.
Moretto			
Gambara	Do.	San Faustino Maggiore	Do.
Foppa			
Sandrino	Do.	Carmini	Do.
Gandino			
Rama			
Barucco			
Ferrammola . . .			
Moretto	Do.	San Giov. Evangelista	Do.
Romanino			
Ant. Gandini . . .			
Fiaminghino . . .	Do.	Sta. Maria del Grazzie	Do.
Marone			
Pilati			
Rossi			

Painters' Names.	Kind of Subject.	Locality.	Methods.
BRESCIA.—*con.*			
Gambara	Religious	Sta. Eufemia	Fresco.
Romanino, Gambara	Classical	Strada del Gambara	Do.
Ferrammola	.....	Casa Martinengo della Fabricia	Do.
Gambara	Allegorical	Corso del Mercanti	Do.
Unknown, 13th century	Religious	San Pietro-Sermione.	Do.
VERONA.			
Unknown, 13th century	.....	San Fermo	Fresco.
Caroto	Religious	Sta. Euphemia	Do.
Stefano de Zevio	Do.	Do.	Do.
Unknown	.....	Sta. Elena	Mosaic.
Paolo Farinati	Religious	SS. Nazaro e Celso	Do.
Unknown, 6th century	Do.	Do.	Do.
Do. do.	Do.	Sta. Anastasia	Do.
Giolfino	.....	San Bernardino	Fresco.
Moroni	.....	Capella Pellegrini	Do.
PADUA.			
Giotto	Various	Palazzo della Ragione	...
Giusti, Aldighiero di Zevio	Religious	Duomo	Fresco.
Jacopo Avanzi, Aldighiero di Zevio	Do.	Do. Sta. Felice	Do.
Avanzi	Do.	San Giorgio	Do.
Giotto	Sacred and Legendary	Giotto's Chapel	...
Guarienti	Allegorical	Eremitani	Fresco.
Mantegna	Legendary	Do.	Do.
Gualtieri, Campagnola	.....	Palazzo Venezze	Do.
Unknown	.....	Do. Pappafava	Do.
VENICE.			
Tintoretto	.....	Doge's Palace	Fresco.
Tintoretto, P. Veronese, Carl. and Gab. Caliari, Leonardo Bassano, Fiammingo, Il. Vicentino	Historical	Do.	Oil, on canvas.

Painters' Names.	Kind of Subject.	Locality.	Methods.
VENICE.—*con.*			
Palma Girol. Gamberata De Clerch Giulio del Moro I. Palma	Historical	Doge's Palace	Oil on canvas
L'Aliense D. Tintoretto	Do.	Do.	Oil.
Il. Vicentino L'Aliense Marco Vicellio Tintoretto Bellotti Liberi Santo Peranda	Do.	Sala dello Seratinio	Do.
P. Veronese Tintoretto	Legendary	Sotto Piombi	...
Luigi Gaetano Pietro Vecchio Pietro Spagna Zuccato, after Pordenone Tintoretto	Religious	San Marco	Mosaic.
Zuccati, after Tintoretto	Do.	Sacristy, do.	Do.
Unknown	.....	Tribunale d'Appelo	Do.
Vivarini	Religious	San Giov. E. Paolo	Distemper.
Tintoretto Vivarini Giov. Bellino Bonifazio	Do.	Do.	Oil.
Vittoria Campagna Leonardo Bassano	Do.	Capella dell Rosario	...
Tintoretto Cima da Conegliano Palma Vecchio Giov. Bellino	Do.	La Madonna dell' Orto	Oil.
Lazarini	Do.	San Pietro di Castello	...
Tintoretto, after	Do.	Do.	Mosaic.
Giov. Bellino Tintoretto	Do.	San Zaccaria	Oil.
Giov. Bellino Paolo Veronese	Do.	San Francesco della Vigna	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
VENICE.—*con.*			
Titian	Religious	Santa Salvatore	Oil.
Palma Giovini, Tintoretto, Titian	Do.	Chiesa de' Gesuiti	Do.
Tintoretto, G. Bellino	Do.	Il Santissimo Redentore	...
Bassano, Tintoretto	Do.	St. Giorgio Maggiore	...
Titian, Tintoretto, Salviati	Do.	Sta. Maria della Salute	Do.
P. Veronese, Titian, Palma, Tintoretto	Do.	San Sebastiano	Do.
Tintoretto	Do.	Scuola di San Rocco	Do.
Cima da Conegliano, L. Lotto, Tintoretto	Do.	Sta. Maria del Carmine	Do.
Tintoretto, Titian, Pordenone	Do.	St. Rocco	Do.
Giov. Bellino, S. del Piombo, Vivarini	Do.	San Giov. Crisostomo	Do.
P. Veronese	Historical	Palazzo Pisani	Do.
Giov. da Udine	.....	Do. Grimani	Fresco.
MURANO.			
Giov. Bellino, Tintoretto, P. Veronese, Palma Vecchio	.....	San Pietro e San Paolo	...
Unknown, 10th century	Religious	Sta. Maria Torcello	Mosaic.
PIACENZA.			
Malosso	Religious	San Francesco Grande	Fresco.
Camillo Gavassetti	Do.	Sant' Antonio	Do.
Campi, Sojaro, Pordenone, Tiarini, Gavassetti	Do.	Sta. Maria della Campagna	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
PIACENZA.—*con.*			
Camillo Procaccini, P. Giovane, Bassano, Oraz. Farinata	Religious	San Sisto	...
And. del Sarto, Pordenone	.....	Casa Borani	Fresco.
PARMA.			
Correggio, Mazzuoli, Lattanzio Gambara	Religious	Duomo	Fresco.
Grassi	Do.	Do. Baganzola Chapel	Do.
.....	.....	Do. Crypt	Mosaic.
Nicolo da Reggio, Bartolomeo da Piacenza	Religious	Do. Baptistry	Fresco.
Correggio	Do.	San Giovanni	Do.
Do.	Fanciful	San Lodovico	Do.
Parmigiano	Sacred	Do.	Do.
REGGIO.			
Lucca Ferrari, Tiarini, Lion. Spada, Desani, Gavassetti	Religious	Madonna della Ghiara	Fresco.
Campi, Procaccini	Do.	San Prospero (Basilica)	Do.
MODENA.			
Stefano de Serafini	Religious	Duomo	...
Nicolo del Abate, Franc. da Bologna	.....	Ducal Palace	Fresco.
LUCCA.			
Unknown	.....	Duomo	Mosaic.
Amico Aspertini.	.....	Do.	Fresco.
Fra. Bartolomeo	.....	San Romano	Oil.
Guercino	Legendary	Sta. Maria Forisportam	Do.
Palma Vecchio, Zac. il Vecchio	Do.	San Pietro Somaldi	Do.
Guido	Do.	Sta. Maria Nera	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
PISTOIA.			
Paolo Uccello	Portrait	Palazzo della Communita.	Fresco.
Unknown	Religious	Duomo Capella de Sacramento	Do.
Crist. Allori Fra. Paolino Ghirlandajo Seb. Veronese	Do.	San Paolo	Do. Oil.
PRATA.			
Fra. Filippo Lippi	Religious	Duomo	Fresco.
Agnolo Gaddi	Do.	Capella della Sacra Cintola	Do.
PISA.			
Cimabue Frato Mino da Turrita A. Tasi Gad. Gaddi Vecino	Religious	Duomo	Mosaic.
Bernard Falconi Riminaldi Mecharino Beccafume Ghirlandajo	Do.	Do.	Fresco.
Giotto	Do.	.....	...
Buffalmaco Simone Memmi Ant. Veneziano And. Orcagna Bern. Do. Piet. Laurate Spinello Spinelli Benozzo Gozzoli	Do.	Campo Santo	Fresco.
Cigoli Ligozzi Crist. Allori Jacopo da Empoli	Historical	San Stefano	Do.
Bronzino Lod. Buti Vasari	Religious	Do.	...
Unknown	.....	Collegio Puteano	Fresco.
Francesco Traini Fra. Bartolomeo Tempesta	Religious	Sta. Caterina	Oil.

Painters' Names.	Kind of Subject.	Locality.	Methods.
PISA.—*con.*			
Unknown	Do.	San Nicolo	Mosaic.
Aurelio Lomi	Religious	San Nicolo	...
Do.	Do.	San Matteo	...
EMPOLI.			
Giotto, Jacopo da Empoli, Cigoli, Ligozzi	Religious	Collegiate Church	...
Ghirlandajo	Do.	Baptistry	...
Volterano	Do.	San Stefano	Fresco.
FLORENCE.			
Orcagna, Nanni d'Antonio, De Banchi	Religious	Duomo	Mosaic.
Vasari, Zucheri	Do.	Do.	Fresco.
And. del Castagno, Paolo Uccelli	Portrait	Do.	Do.
And. Pisano, Giotto, Luca della Robia	Allegorical	Campanile	Do.
Apollonius, And. Tassi, Gaddo Gaddi, Tad. Do., Fra. Jacopo da Torrita, Agnolo de Gaddi, D. Ghirlandajo	Religious	Baptistry	Mosaic.
Ang. Gaddi, Jac. di Casentino	.....	Santa Croce	Fresco.
Vasari, Giotto, Tad. Gaddi	Religious	Chapel Holy Sacrament	Do.
Martellini	Historical	Do.	Do.
Tad. Gaddi, Crist. Allori	Religious	Capella Guigni	Do.
Billiberti, And. del Sarto, Cimabue	Do.	Do. Ricardi	...
Tad. Gaddi	Do.	Do. dei SS. Martiri	Fresco.
Bronzino, Sassoferrato	Do.	Santa Croce	..

Painters' Names.	Kind of Subject.	Locality.	Methods.
FLORENCE.—*con.*			
Giotto Cimabue	Religious	Refectory, Santa Croce	Fresco.
Dom. Ghirlandajo	Do.	Santa Maria Novella	Do.
Bernard. Orcagna And. Do.	Do.	Capella Strozzi	Do.
Bronzino	Do.	Refectory (old)	Do.
Paolo Uccello Dello	Do.	Chiostro Verde	Do.
Simone Memmi Tad. Gaddi	Allegorical and Legendary	Capella degli Spagnuoli	Do.
Beato Angelico	Religious	San Marco	Do.
Bronzino	Historical	Convent do.	Do.
Passignano Jacopo da Empoli Santi di Tito	Religious	Chapel of the Holy Sacrament	Do.
Unknown	.....	Capella Ricci	Mosaic.
Beato Angelico	Religious	Passages, Convent	Fresco.
.....	Do.	Santo Spirito	Do.
Paolo Perugino Ulivelli Baldi Cascetti Bimbacci	Legendary	Sacristy do.	Do.
Masolino Masaccio Filippo Lippi	Sacred and Legendary	Carmine	Do.
Andrea del Sarto Franciabigio Pantormo Cos. Rosselli	Legendary	Annunziata	Do.
Beato Angelico Santi di Tito A. Bronzino Pietro Perugino Empoli	Religious	Capella de' Pittori	...
Il Volterano Ulivelli	Do.	Do.	Fresco.
And. del Sarto	Do.	Dello Scalzo	Do.
Vasari L. della Robia	Do.	Santi Apostoli	...
Pocetti Dom. Ghirlandajo	.....	Santa Trinità	Fresco.
Daniele da Volterra	Religious	Santa Felice	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
FLORENCE.—*con.*			
Pocetti Santi di Tito Angelico da Fiesole	Religious	Sta. Maria Maddelena de' Pazzi	...
P. Perugino	Do.	Do.	Fresco.
Vasari Cigoli Passignano Ligozzi	Historical	Palazzo Vecchio	...
Ghirlandajo	Religious	Chapel do.	Do.
Giotto	Do.	Chapel Palazzo del Bargello	Do.
Luca Giordano	Allegorical	Palazzo Ricardi	Do.
Marco da Faenza Cristofero Papi	Arabesque and Portrait	Galeria Imperiale	...
Pietro da Cortona Ciro Ferri	Allegorical	Hall of Mars, Jupiter, Saturn, gallery	Fresco.
Sabatelli	Do.	Do. of the Iliad	Do.
Rossellino	Do.	Strofa	Do.
Catani	Do.	Do. of the Education of Jupiter	Do.
Martellini	Do.	Do. of Ulysses	Do.
Colignone Fedi	Do.	Do. of Justice	Do.
Marini Landi	Do.	Do. of Flora	Do.
Marini Rabbinati	Do.	Do. "dei Patri"	Do.
Pocetti	Do.	Do. Pocetti	Do.
Fra. Bartolomeo	Religious	Ospedale di Sta. Maria Nuova	...
Gaddi	Do.	San Miniato	Mosaic. Fresco.
Spinello Aretino	Do.	Chapel Saint James, Do.	Fresco.
Do.	Do.	Campo Santo	Do.
Pocetti	Do.	La Certosa	Do.
Il Volterrano	Historical	La Petraja	Do.
Unknown	Do.	Duomo Fiesole	Do.

CENTRAL ITALY.

Painters' Names.	Kind of Subject.	Locality.	Methods.
FERRARA.			
Garofalo Bastianino Cosimo Tura	Religious	Duomo	...
Garofalo Scarsellino Mona Ortolano	Do.	San Francesco	...
Carlo Bonone	Do.	Sta. Maria del Vado	Fresco.
Dosso Dossi Palma Vecchio Panetti Carpi Vit. Carpaccio	Do.	Do.	...
Dosso Dossi Scarsellino Luca Longhi G. Caletti	Do.	San Benedetto	...
Scarsellino Bonone	Do.	San Paolo	Fresco.
.....	Do.	Capuchin Convent	...
Nic. Rosselli Dielai Carl. Bonone Bastianino Bastaruolo Scarsellino Cignaroli Parolini	.....	Campo Santo	...
Dosso Dossi	.....	The Castle	Fresco.
Garofalo D. Dossi Bastianino Cos. Tura Ortolano Guercino H. Caracci	Religious	Palazzo del Magistrato	...
Guercino	Various	Casa Guercino, Cento	...
Do.	Religious	Chiesa del Rosario, do.	...

Painters' Names.	Kind of Subject.	Locality.	Method
BOLOGNA.			
Pellegrino Tibaldi	.....	University	Fresco
Nic. dell'Abate	.....	Do.	Do.
Innocenzio da Imola	Classical	Lecture Room, Botan. Gardens	Do.
Unknown, 12th and 13th century	Religious	San Stefano	...
Teresa Muratori			
Gioseffo Dal Sole			
Graziani			
Bigari			
Franceschini			
Bagnacavallo			
Zanotti			
Lod. Caracci	Do.	Duomo	? Oil.
Dom. Tibaldi			
Fiorini			
Aretusi			
Don. Creti			
Ercole Graziani			
Alf. Lombardo			
Guido			
Fran. Francia			
Tiarini			
Lor. Costa			
Girolamo da Treviso			
Brizzi	Do.	Do.	Fresco
Tiarini			
Calvart			
Parmigiano			
Costa			
Fil. Brizzi			
Ferrari			
Fran. Colonna	Do.	Sacristy, Do.	...
Mazzoni			
Tiarini			
Mastelletta	Do.	San Domenico	Fresco
Guido			
Lion. Spada			
Lip. Dalmasio			
Facini			
Fran. Francia	Do.	Chapels, Do.	Oil.
Ant. Rossi			
Fran. Brizzi			
Guercino			

Painters' Names.	Kind of Subject.	Locality.	Methods.
BOLOGNA.—*con.*			
Fiamingo Cesi Lod. Caracci Guido	Religious	Chapels del Rosario	Fresco.
Cangiasi G. Vasari Lion. Spada	Do.	Sacristy	...
Lod. Caracci Albani Francheschini Guido Tiarini Aretusi	Do.	Do.	Oil.
Colonna	Do.	Do.	Fresco.
A. Caracci Lod. Do.	Do.	St. Bartolomeo di Reno	Oil.
Lucio Massari Giacomo Cavedone Gab. Ferrantini Tiarini Gio. Andrea Serani	Do.	San Benedetto	Fresco.
Galanino Franceschini Fiorini Aretusi	Do.	Della Carita	...
Fran. Francia Lor. Costa Giacomo Francia Chiodarolo Mastro Amico Giac. Francia	Legendary	Sta. Cecilia	Fresco.
Marcantonio Franceschini Luigi Quaini Lod. Caracci Giuseppe Mazza An. Caracci	Religious	Corpus Domini	Oil. Fresco.
Lod. Caracci Gia. Francia Guido	Do.	S. Cristina	Oil.
Francia Ercole Procaccini Cavedone Bartol. Passarotti	Do.	S. Giacomo Maggiore	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
BOLOGNA.—*con.*			
Prospero Fontana Inno. da Imola Lod. Caracci Francesco Brizzi Lor. Sabbatini Fiammingo Ag. Caracci Pelegrini Tibaldi Lavinia Fontana Jacopo Avanzi Simone Fran. Francia Lor. Costa Fel. Cignani Nic. di Bari Cesi	Religious	S. Giacomo Maggiore	Fresco.
Simone da Pesaro Alboni Camillo Procaccini Lod. Curacci Tiarini	Do.	San Giorgio	Do.
Annib. Caracci Fiammingo	Do.	S. Gregorio	Oil.
Gia. Francia Cesi Guercino Lipp. Dalmasio Lor. Costa Samacchini Lor. Costa	Do.	S. Giovanni in Monte	Fresco.
Tiarini Lod. Caracci	Do.	S. Leonardo	...
Ercole Procaccini Carl. Anton. Rambaldi Carl. Cignani. Lav. Fontana Fiammingo	Do.	Sta. Lucia	...
Francesca Cossa Properzia de Rossi Lav. Fontana Pros. Do.	Do.	Madonna del Baraccano	Oil.
Antonio Caracci Spada Lor. Garbieri	Do.	Do di S. Colombano	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
BOLOGNA.—*con.*			
Lucio Massari Paolo Caracci Alboni Lippo Dalmasio	Religious	Madonna di S. Colombano	Fresco.
M. Angelo Colonna Girolami Domini Franceschini Luigi Quaini Giuseppe Mazza Teresa Muratori Alboni Guercino Elisabetta Serani Lod. Caracci	Do.	Do. in Galliera	Do.
Gioacchino Pizzoli	Do.	Do. Soccorso	Do.
Tib. Passarotti Bagnacavallo Ercole Procaccini Gius. Crespi	Do.	Sta. Maria Maddalena	...
Bartol. Passarotti	.....	La Maddalena	...
Tiarini Oraz. Samacchini Carl. Fran. Dotti Erco. Procaccini Canonico Franceschini	Do.	Sta. Maria Maggiore	...
Aurel. Milani Ang. Piò Tamburini Simone de Crocifissi An. Caracci Cavedone	Do.	Sta. Maria della Vita	Oil. Fresco.
Bartol. Passarotti Giov. Taraschi Mastro Amico Aspertini Gir. Sicciolante Vicenzo Onofrio Cavedone Perugino Lor. Costa Lod. Caracci Cesi Mauro Tesi	Do.	S. Martino Maggiore	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
BOLOGNA.—*con.*			
Francia Dentone Lucio Massare Giampietro Zanotti And. da Fiesole	Religious	S. Martino Maggiore	Oil. Fresco
Tintoretto Innocenzio da Imola Guido	Do.	S. Mattea	...
Bart. Passarotti Lav. Fontana Ercole Graziani Cavedone Tiarini Mastelletta Bart. Cesi	Do.	Sta. Maria del Pietà	Oil. Fresco
Fran. Gessi Semenza	Do.	S. Michele de' Leprosetti	...
An. Caracci Gessi Alfon. Lombardo	Do.	S. Nicolò di S. Felice	...
Mastelleta Lod. Caracci Lip. Dalmasio Cavedone Guercino Lor. Garbieri Massari	Do.	S. Paolo	Oil. Fresco
Lip. Dalmasio Cesi Ercole Graziani	Do.	S. Procolo	Oil.
Fran. Camullo Ales. Provaglia Valesio Pietro Desani Leb. Razzali Paolo Caracci Cavedone Massari Guercino Fran. Caracci Gessi Colonna	Do.	S. Rocco	Fresco.
Ercole Graziani Masteletta	Religious	Santissimo Salvatore	Oil. Fresco.

Painters' Names.	Kind of Subject.	Locality.	Method.
BOLOGNA—*con.*			
Pros. Fontana Gir. da Trevisi Gir. da Carpi Guido Gessi Carl. Bononi Tiarini In. da Imola Garofalo Cavedone Gaet. Gandolfi	Religious	Santissimo Salvatore	Oil. Fresco.
Cignani Giov. Viani Peruzzini Gius. Mitelli Lor. Borgonzoni	Legendary	Portico de' Servi	Fresco.
Franceschini Erco. Graziani Fiammingo Tiarini Aretusi Elis. Serani Lip. Dalmasio Guido Inno. da Imola Bartol. Ramenghi Alboni Mastaletta	Sacred and Legendary	The Servi	Oil. Fresco.
Lav. Fontana Guercino Gio. Battista Gennori	Do.	SS. Trinità	...
Fran. Francia Gia. Do. Bagnacavallo Tiarini Perugino	Religious	S. Vitale ed Agricola	Oil.
Angelo Bigari Scarabelli Colonna Pizzoli, &c.	Historical	Palazzo Publico	Fresco.
Paolo Avanzi	Religious	Do. del Podesta	...
Guido	.....	Do. de' Biagi	Fresco.
Do.	Classical	Do. de' Bianchi	Do.
Agost. Caracci	Do.	Do. Fava	..

Painters' Names.	Kind of Subject.	Locality.	Methods.
BOLOGNA—*con.*			
An. Caracci Lod. Do. Alboni Lucio Massari	Classical	Palazzo Fava	...
Lod. Caracci	Do.	Do. Grassi	Fresco.
The Caracci	Do.	Do. Guidotti	Do.
Lion. Spada Lucio Massari Franc. Brizzi	Poetical	Do. Malvezzi Bonfioli	Do.
Brizzi Caracci Guido Tibaldi	.....	Do. Mareschalci	...
Dom. Santi Canuti M. Ang. Colonna	.....	Do. Pallavicini	Fresco.
Colonna Canuti Donato Creti Erco. Graziani, &c.	Historical	Do. Pepoli	...
Pros. Fontana	.....	Do. Piella	Fresco.
Tomm. Lauretti Lor. Sabbatini Oraz. Samacchini Tibaldi	.....	Do. Ranuzzi	Do.
The Caracci Guercino	Classical	Do. Sampieri	Do.
Niccolò dell' Abate	Do.	Do. Sedazzi	Do.
The Caracci Guercino Guido	.....	Do. Tanara	...
Cesi	Legendary	Scuole Pie	Fresco.
Bagnacavallo An. Caracci	.....	Spanish College	Do.
Gio. Maria Tamburini Gessi Tiarini Pietro Desani Ang. Colonna	Legendary	Portico Dogana	Do.
Passarotti Lip. Dalmasio Cesi Inno. da Imola	.....	The Misericordia (Environs)	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
BOLOGNA—*con.*			
Francia, Costa, Gessi, Lip. Dalmasio, Massari, Ant. Pinelli, Gia. Lip. da Budrio, P. Caracci	.....	Annunziata (Environs)	Oil. Fresco.
Vitale da Bologna, Lorenzo, Sim. dai Crocifissi, Jacopo Avanzi, Cristoforo	Religious	Madonna di Mezzaratta	Fresco.
Passarotti, Cavedone, Elis. Sirani, Carl. Cignani	.....	St. Paolo in Monte	...
The Caracci, Guido	Legendary	San Michele in Bosco	Fresco.
Canuti	.....	Library do.	Do.
Guido	Legendary	Madonna di S. Luca	Do.
Bibiena, Cesi, Canuti, And. Sirani, Elis. Do., Gessi, Lor. Pasinelli, Lod. Caracci, Amico Aspertini, Massari	Sacred and Legendary	Certosa	Oil. Fresco.
An. Caracci, Ercole Graziani, Inno. da Imola, Oraz. Samacchini, Passarotti, Lip. Dalmasio	Do.	Capuccini	Do. do.
Pasinelli, Canuti, Sabbatini	Religious	Gli Scalzi	Oil.
RAVENNA.			
Guido, Carl. Bononi	Religious	Duomo	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
RAVENNA—*con.*			
Unknown	Religious . . .	Cupola, Duomo .	Mosaic.
.....	Do.	San Vitale . . .	Do.
Gessi			
And. Barbiani . .			
Luc. Longhi . . .			
Barbara Do. . . .	.....	Chapel SS. Sacramento do.	...
Franc. Do. . . .			
Giambat, Barbiani .			
Cam. Procaccini . .			
Giotto	Religious . . .	Basilica S. Giovanni Evang.	Fresco.
Franc. Longhi . . .	Do.	S. Giov. Battista .	Do.
Pasquali da Forli . .	Legendary . .	San Vittore . . .	...
Unknown	Do.	S. Apollinare Nuovo	Mosaic.
Fran. da Cotignola .	Religious . . .	Sta. Agata . . .	...
Luca Longhi . . .			
Unknown	Do.	S. Michele, in Affricisco	Mosaic.
.....	Do.	Santa Maria, in Cosmedin	Do.
Filippo Pasquali . .			
Dom. Corvi . . .	.....	Sta. Maria Maddalena	...
Tomm. Sciacca . .			
Franceschini . . .			
Guercino			
Carl. Cignani . . .			
Fran. da Cotignola .	.....	S. Romualdo . .	Oil. Fresco.
P. Cesare Pronti .			
Luca Longhi . . .			
Fran. Do.			
Palma Giovane . .	Legendary . .	Sta. Maria, in Porto	...
Luca Longhi . . .			
Giotto	.....	Sta. Chiara (convent)	Fresco.
Unknown, Ancient . .	Religious . . .	Galla Placida (mausoleum)	Mosaic.
.....	Do.	Archbishop's Pal.	Do.
Giotto	Do.	Sta. Maria, in Porto Fuori	Fresco.
Unknown, Ancient . .	Do.	Bas. of St. Apollinare	Mosaic.
FORLI.			
Carlo Cignani . . .	Religious . . .	Santa Croce (cupola)	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
FORLI—*con.*			
Carl. Cignani . . . Guercino . . . . Carl. Marrati . . .	Religious . . .	S. Filippo Neri .	...
Guido	Do.	S. Gerolamo . .	Oil.
Inno. da Imola . . .	Do.	S. Mercuriale . .	...
Melozzo da Forli . .	.....	Spezeria (exterior)	Fresco.
CESENA.			
Fran. Franchia . . .	Religious . . .	Palazzo Publico .	Oil.
Guercino	Do.	Capuchin Church .	Do.
RIMINI.			
Paul Veronese . . Guercino . . . . Pronti	Religious . . .	S. Giuliano . . .	Oil. Fresco.
SAN MARINO.			
Guilio Romano . . .	Religious . . .	Council Chamber .	...
PESARO.			
Guido	Religious . . .	Cathedral . . .	Oil.
Giov. Bellini	Do.	S. Francesco . .	...
Vicenzo Severino . .	Do.	S. Domenico . .	...
Girolamo da Cotignola	Legendary . .	Servites	...
Nic. da Pesaro . . .	Religious . . .	SS. Sacramento	...
Guercino	Do. . . .	S. Giov. di Riformati . .	...
ANCONA.			
Domenichino . . . Lod. Caracci . . .	Religious . . .	Cathedral . . .	Fresco.
Perugino . . . . Genga . . . . . Sassoferrato . . . Giov. Santi . . .	Do.	Sta. Maria Nuova	Oil. Fresco.
Guercino . . . . Cav. d' Arpino . . Claudio Ridolfi . . Aless. Tiarini . . . Viviani	Do.	S. Paterniano . .	Fresco.
Pompeo Presciutti . Bartol. Do. . . .	Do.	S. Tommaso . .	...
Guido . . . . . Cantarini . . . . Viviani	Do.	S. Pietro	Oil. Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
ANCONA—*con.*			
Guercino Palma Vecchio Giov. Santi Muziani Albani Presciutti Mancini Ceccarelli	Religious	S. Agostino	Oil. Fresco.
Domenichino	Do.	Folfi College	Oil.
Tibaldi Andrea di Ancona Roncalli	Do.	S. Agostino	...
Marco Benefial Lor. Lotto	Legendary	Sta. Maria del Piazza	Oil.
Titian Guido Bellini	Religious	S. Francesco	Do.
Guercino	Do.	Sta. Pelagia	Do.
Tibaldi	Mythological	Loggia de' Mercanti	Fresco.
LORETO.			
Luca Signorelli Crist. Roncalli Lombardelli	Religious	Chiesa della Santa Casa	Do.
Carlo Maratta After Domenichino Do. Guido Do. Fra. Bartolomeo Simon Vouet After An. Caracci.	Do.	Do. do.	Mosaic.
Fred. Zuccari. Luca Signorelli Pietro da Cortona Pellegrino Tibaldi	Do.	Do. do.	Fresco.
Baroccio	Do.	Chapels do.	Mosaic.
Muziano Gasperini Lombardelli Cristo. Roncalli Jacometti Pietro Lombardo	Do.	Do. do.	Fresco.
Unknown	Do.	Church Castel Nuovo	...

Painters' Names.	Kind of Subject.	Locality.	Methods.
MACERATA.			
Perugino (Qy.) . .	Religious . . .	Cathedral . . .	Oil.
Alegretto di Nuzio .			
Lanfranco	Do.	S. Giovanni . . .	...
URBINO.			
Baroccio	Religious . . .	Cathedral . . .	...
Raffaele del Colle .			
Giovanni Santi . . .	Do.	S. Francesco . .	Oil.
Timoteo della Vita . .	Do.	S. Guiseppe (sacristy) .	Do.
Titian	Do.	S. Francesco di Paolo . .	Do.
Lorenzo da S. Severino	Do.	Confraternita di S. Giovanni (oratory) .	Fresco.
Georgio Andreoli .	Do.	Church and Nunnery Sta. Chiara . .	Oil.
Raffaelino del Garbo			
Justus Van Ghent . .	Do.	Sta. Agata . . .	Do.
Baroccio	Do.	Capuchin Convent	Do.
URBANIA.			
Giulio Romano . . .	.....	Confraternita di Corpus Domini	Fresco.
Tad. Zuccari	Legendary . .	Sta. Caterina . .	Oil.
SAN GIUSTINO.			
Doceno	.....	Palazzo Bufalini .	Fresco.
CITTA DI CASTELO.			
Bernardino Gagliardi			
Perino del Vag (?)			
Virgilio Ducci . .	Legendary . .	Cathedral . . .	Oil.
Sguazzino			
Ghirlandajo . . .			
Giov. Serodine . .			
Rinaldo Rinaldi . .	Religious . . .	Do.	Fresco.
Marco Benefiale . .			
Rosso Fiorentino . .	Do.	Capellone do. . .	Do.
Pomarancio . . .			
Tom. Conca . . .			
Raffaele del Colle .	Do.	San Francesco . .	Oil.
Ant. Circignani . .			
Giorg. Vasari. . .			

Painters' Names.	Kind of Subject.	Locality.	Methods.
CITTA DI CASTELLO—*continued.*			
Sguazzino Pomarancio	Legendary	S. Bartolommeo	Fresco.
Andrea Carloni	Do.	Sta. Caterina	Oil.
Pomarancio Gagliardi Squazzino	Do.	Do.	Fresco.
Luca Signorelli	Do.	Sta. Cecilia	Oil.
Santi di Tito Angelico da Fiesole Gregorio Pagani	Do.	San Domenico	...
Crist. Gherardi Sguazzino Luca Signorelli Raphaele da Reggio Franc. da Castello	Do.	Do.	Oil. Fresco.
Rinaldo Rinaldi Pinturicchio	Do.	S. Giovanni Decollato	Oil.
Virgillio Ducci	Do.	Do.	Fresco.
Luca Signorelli	Religious	St. Maria Maggiore	Do.
Cesare Maggieri	Legendary	Do.	Oil.
Giov. Ventura Borghesi	Do.	S. Pietro	Do.
Cav. Francesco Mancini	Religious	Do.	Do.
Sguazzino Virgilio Ducci Bernardino Dini Giov. Vent. Borghesi	Legendary	S. Sebastian	Fresco.
Raffaele de Colle	Religious	The Servites	Oil.
Raphael	Do.	Confra. SS. Trinità	Do.
P. della Francesca (?) Circignani Sguazzino	Do.	The Hospital	Do.
Lucca Signorelli	.....	Palazzo Comunale (gateway)	Fresco.
Do. do.	Religious	Palazzo Vascovile	Do.
Docceno Pros. Fontana	Various	Do. Paolo Vitello	Do.
Giu. da Pesara And. del Sarto Vandyck	.....	Do. Bufalini	Oil.
Tommaso Conca	.....	Do. Lignani	Fresco.
BORGO SAN SEPOLCRO.			
Palmo Giovane	Religious	Cathedral	Oil.

Painters' Names.	Kind of Subject.	Locality.	Methods.
BORGO SAN SEPOLCRO—*continued.*			
Santa di Tito Gio. Bat. Cungi Chiali Raff. del. Colle P. Perugino Ant. Cavalucci Cherubino Alberti Durante Do. Giov. de Vecchi Giov. Alberti Gerina da Pistoja	Religious	Cathedral	Oil.
Giov. de' Vecchi Passignano Durante Alberti	Legendary	S. Francesco	...
Raff. del Colle Gio. Bat. Cungi Rosso Fiorentuo	Do.	Madonna del Grazie	Oil.
Raff. Scaminossi	Religious	Ch. of the Orphans	Do.
Pomarancio Giov. de' Vecchi Taddeo Gaddi	Legendary	The Servites	Do.
Pietro della Francesca Cherubino Alberti	Do.	St. Chiara	Oil. Fresco.
Bassano Giov. de' Vecchi Raff. del Colle	Religious	P. P. Minori Osservanti	Oil.
Do. do.	Do.	S. Rocco	...
Pietro della Francesca	Do.	Sta. Maria della Misericordia	...
Luca Signorelli	Do.	S. Antonio Abate	...
Caracci Gio. Battista Cungi Gerino da Pistoja	Do.	S. Agostino	Oil.
Raff. del Colle Cherubino Alberti	Legendary	Convent S. Leo	Fresco.
Pietra della Francesca	Religious	Monte di Pieta	Do.
CITERNA.			
Raff. del Colle, &c., &c.	Religious	S. Francesco	Oil. Fresco.
GUBBIO.			
Raff. del Colle	Legendary	Olivetani	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
ORVIETO.			
Unknown	Religious	Duomo	Mosaic.
Luca Signorelli, Angel. da Fiesole, Benozzo Gozzoli, &c.	Do.	Do.	Fresco.
Various	Various	Palazzo Gualtieri	Oil. Fresco.
CITTA DELLA PIEVE.			
Pietro Peregino	Religious	Sta. Maria de' Bianchi	Fresco.
VOLTERRA.			
Mino da Fiesole	Religious	Duomo	Mosaic.
Pomarancio, Giov. de G. Giovanni, Domenichino, Cav. Francesco Currandi, Matteo Rosselli, Giov. Balducci	Do.	Do.	Fresco.
Benozzo Gozzolo	Do.	Chapel of the Virgin	Do.
Pomarancio	Do.	S. Giovanni	Oil.
Luca Signorelli, Giov. Balducci, Gioballista Naldini, Cosimo Daddi	Do.	S. Francesco	Do.
Jacopo da Furenge, Cennino da Colle	Do.	Confra. della Croce di Giorno	Fresco.
Franc. Curadi, Volterano	Do.	S. Agostino	...
Carlo Maratta, Giuseppe Zocchi	Do.	S. Michele	Oil.
Domenico Ghirlandajo	Do.	S. Antonio	Do.
Taddeo Bartolo	Do.	Do.	Fresco.
Daniele da Volterra	Do.	Casa Ricciarelli	Oil.
Do. do.	.....	Do. Masselli	Fresco.
Dom. Ghirlandajo, Donato Mascagni, Gio. Paolo Rossetti, Volterrano	Religious	The Camaldolese Monastery	Oil.
Volterrano, Don. Mascagni	Do.	Do. do.	Fresco.
SIENA.			
Duccio di Buoningsegna	Religious	Duomo	Oil.

Painters' Names.	Kind of Subject.	Locality.	Methods.
SIENA—*con.*			
Pinturicchio	Historical . .	The Library . .	Fresco.
Sodona			
Perugino			
Matteo da Siena . .	Religious . . .	S. Agostino . . .	Oil.
Petrazzi			
Frac. Vanni . . .			
Bernardino Fungai .			
Frac. Vanni . . .			
Matteo di Giovanni .	Do.	La Concezzione .	Do.
Manetti			
Casolani			
Pacchiarotto	Do.	San Cristoforo . .	Do.
Bernardino Fungai .			
Beccafumi			
Casolani	Do.	Carmine	...
Arcangelo Salimbeni			
Guido da Siena . .			
Matteo da Siena . .			
Ventura Salimbeni .			
Luca Signorelli . .	Do.	San Domenico . .	Oil. Fresco.
Sodona			
Franc. Vanni . . .			
Andrea di Vanni .			
Sodona	Do.	San Francesco . .	Do. do.
Beccafumi			
Baldassare Peruzzi .	Legendary . .	Fonte Giusta . .	Oil.
Bernardino Fungai .			
Francesco Vanni . .	Do.	Sta. Lucia . . .	Do.
Rustichino	Religious . . .	Sta. Maria di Provenzano	Do.
Guido	Do.	San Martino . .	Do.
Guercino			
Lorenzo Cini	Historical . .	Do.	...
Franc. Vanni . . .			
Casolani	Religious . . .	San Quirico . .	Oil.
Salembeni			
Sodona			
Salimbeni			
Fra. Bartolommeo .	Do.	San Spirito . . .	Oil. Fresco.
Pacchiarotto . . .			
Franc. Vanni . . .			
Dieti Salvi . . .			
Bonaventura da Siena	Do.	Sta. Maria de' Servi	Fresco.
Gregorio Do. .			

Painters' Names.	Kind of Subject.	Locality.	Methods.
SIENA—*con.*			
Ventura Salembeni. Matteo di Giovanni. Raff. Vanni . . .	Various . . .	La Trinita . . .	Oil. Fresco
Sodona . . . . . Pacchiarotto . . . Vent. Salimbeni, &c.	Do.	St. Catherine of Siena (oratory) .	...
Sodona . . . . . Pacchiarotto . . . Beccafumi . . . . Manetti . . . . Francesca Vanni . Vent. Salimbeni, &c.	Legendary . .	San Bernardino (oratory)	Oil.
Petrazzi	Historical . .	Ceiling Palazzo Publico . .	Fresco.
Ambrog. Lorenzetti .	.....	Salle delle Balestre Do. .	Do.
Sermino di Simone . .	Legendary . .	Sala del gran Consiglio Do.	Do.
Simone Memmi . . .	Historical . .	Do. Do. . .	Do.
Taddeo Bartola . . .	Religious . . .	Chapel Do. . .	Do.
Beccafumi . . . . Spinello Aretino .	Historical . .	Sala del Consistorio Do. .	Do.
Bernhard von Orley .	.....	Palazzo Piccolomini . . .	Do.
Sodona	Historical . .	Do. Pollini . .	Do.
Folli.	Legendary . .	Casa Mensini (exterior) .	Do.
Sodona . . . . . Peruzzi	Do.	Do. Bambacini (Do.) . .	Do.
Giac. del Capanna . .	.....	Do. Nastasi (Do.)	Do.
Domenico Bartolo . .	Historical . .	The Hospital . .	...
Sebastiano Conca . .	Religious . . .	Do.	Fresco.
Sodona	Do.	P. San Viene . .	Do.
Sano Lorenzetti . . .	Do.	Porta Romana . .	Do.
Baldassare Peruzzi . .	.....	Castle of Belcaro .	Do.
The Caracci	Religious . . .	Church. Bisentina	...
VITERBO.			
Franc. Romanelli . Urbano Do. . . Marco Benefial . .	Legendary . .	Duomo	...
Sebas. del Piombo . .	Religious . . .	S. Francesco . .	Oil.
Do.	Do.	Osservanti . . .	Fresco.
Leonard. da Vinci . .	Do.	Do. (exterior) .	...

Painters' Names.	Kind of Subject.	Locality.	Methods.
VITERBO—*con.*			
Salvator Rosa	Religious	Della Morte	Oil.
Cav. d' Arpino, Marcello Venusti	Do.	S. Ignazio	Do.
Lor. di Giac. da Viterbo	Do.	Sta. Maria della Verita	Fresco.
Baldassare Croce	.....	Palazzo Publico	Do.
CAPRAROLA.			
Frederico Zuccari, Ottav. Do., Taddeo Do.	Historical	Castle Caprarola	Fresco.
GIOVANNI.			
Giov. da S. Giovanni	Religious	Cathedral	Fresco.
Masaccio	Do.	S. Lorenzo	Do.
AREZZO.			
Vasari	Legendary	Sta. Maria della Pieve	Oil.
Giotto	Do.	Cathedral	Fresco.
Benvenuti, Sabatelli	Religious	Do.	Oil.
Padre Pozzi	.....	Badi di Sta. Flora (cupola)	Fresco.
Vasari	Religious	Do.	Do.
Pietro della Francesca	Historical	S. Francesco	Do.
Spinello Aretino	Religious	S. Angelo (destroyed)	Do.
CORTONA.			
Luca Signorelli, Pietro da Cortona	Religious	The Cathedral	...
Luca Signorelli, Baroccio, Vanni, Empoli	Legendary	Santa Margherita	Oil.
Unknown	Do.	Do.	Fresco.
Luca Signorelli, Angelico da Fiesole, Jacone	Religious	Gesù	Oil.
Cigoli	Legendary	S. Francesco	...
Angelico da Fiesole, Pietro Panicale, Palma Giovane	Religious	S. Domenico	Oil.

Painters' Names.	Kind of Subject.	Locality.	Methods.
CORTONA—*con.*			
Pietro da Cartona Empoli	Religious	S. Agostino	Oil.
PERUGIA.			
Baroccio Pinturicchio Luca Signorelli Giannicola	Religious	Duomo	Oil.
Pietro Perugino	Do.	S. Agnese	...
Perugino Dom. di Paris Albani Lod. Caracci Guercino Taddeo Bartolo	Do.	S. Agostino	Oil.
Raphael Perugino	Do.	S. Antonio (despoiled)	Do.
Benedetto Bonfigli Perugino	Do.	S. Bernardino	Do.
Benedetto Bonfigli Giannicola	Do.	S. Domenico	Do.
Gian. And. Carloni	.....	S. Ercolano	Fresco.
Perugino	Legendary	Do.	Oil.
Perugino Oraz. Alfani Cav. d' Arpino	Do.	S. Francesco	Do.
Vittore Pisanello Fiorenzo da Lorenzo Benedetto Bonfigli	Do.	Do.	Do.
Perugino	Religious	Sta. Giuliana	Do.
Do.	Do.	Confra. S. Pietro Martire	Do.
Aliense Gimignani Oraz. di Paris Alfani Vent. Salimbeni Andone Doni Raphael Sassoferrato Perugino Fiammingo La Spagna	Do.	S. Pietro de' Casinensi	Do.
Vasari Girolamo Danti	Do.	Do.	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
PERUGIA—*con.*			
Sassoferrato Paris Alfani Perugino Raphael Caravaggio Parmigiano Dosso Dossi Bassano Titian Guercino	Religious	S. Pietro de' Casinensi	Oil.
Raphael	Do.	S. Severo	Fresco.
Giannicola	Do.	S. Tommaso	Oil.
Bedetto Bonfigli Andone Doni	Do.	Palazzo Comunale	Fresco.
Perugino	Do.	Do.	...
Perugino, assisted by Raphael	Do.	Sala del Cambio	Fresco.
Perugino	Legendary	Casa Perugino	Do.
Perugino	Religious	S. Francesco del Monte	Do.
ASSISI.			
Cimabue Giotto Giunta da Pisa Lo Spagna Pietro Cavallino ..... Puccio Capanna Jacopo Gaddi Giov. da Melono Andone Doni L'Ingegno Giottino Buffalmaco Simone Memmi	Religious	Sagro Convento	Fresco.
Giotto or Giottino	Do.	Sta. Chiara	Do.
Martinelli	Do.	Sta. Caterina (exterior)	Do.
Matteo da Gualdo P. Antonio da Fuligno	Do.	Do. (interior)	Do.
SPELLO.			
Perugino	Religious	Cathedral	Oil. Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
SPELLO—*con.*			
Pinturicchio	Religious . . .	Cathedral . .	Oil. Fresco.
Pinturicchio	Do.	S. Lorenzo . . .	...
FOLIGNO.			
Perugino (?) . . .	Religious . . .	The Contesse . .	Oil.
Lod. Caracci . . .			
Nicolò Alunno . . .	Do.	S. Nicolò . . .	Do.
MONTEFALCO.			
Benozzo Gozzoli . . .	Religious . . .	S. Fortunato . S. Francesco .	...
SPOLETO.			
Solsernus, 1220 . . .	Religious . . .	Cathedral . . .	Mosaic.
Filippo Lippi	Do.	Do.	Fresco.
Lo Spagna	.....	Palazzo Publico .	Do.
Crevelli	Religious . . .	Piazza della Porta Nuova	Do.
NARNI.			
Lo Spagna	Religious . . .	Zoccolanti . . .	...
PONTE MOLLE.			
Taddeo Zuccari . . .	.....	Casino della Reverenda Camera	Fresco.

ROME.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Unknown, 11th or 12th cent.	Religious	S. Urbano, Temple of Bacchus	Fresco.
Do., Ancient	Arabesques	Baths of Titus	Do.
Pierino del Vaga, Sicciolante, Giulio Romano	Various	Mausoleum of Hadrian	Do.
Unknown, Ancient	Classical	Painted Tomb, Via Latina	...
Do. do.	.....	Columbarium, Luc. Arruntius	...
Giacomo della Porta	Religious	St. Peter's, Dome	Mosaic.
Marcello Provençal, after Cav. d'Arpino	Do.	Do., Lantern	Do.
Francesco Vanni	Do.	Do.	Oil.
Guido, after; Camuccini, after; Domenichino, after; Roncalli, after; Raphael, after; Pietro Bianchi, after; Francesco Romanelli, after; Filippo Barigioni, after	Do.	Do., Chapels	Mosaic.
Pietro Cavallini	Do.	Do., Crocifisso	Do.
Domenichino, after	Do.	Do., St. Sebastian	Do.
Pietro da Cortona	Do.	Do., Holy Sacrament	Do. Fresco.
Girolamo Muziani	Do.	Do., Madonna del Soccorso	Do.
Subleyra, after; Caroselli; Poussin	Do.	Do., St. Basil	Do.
Lanfranco	Do.	Do., La Navicella	Do.
Guido, after; Guercino, after; Costanzi, after	Do.	Do.	Do.
Simone Memmi	Do.	Do., Grotte Nuove	..

Painters' Names.	Kind of Subject.	Locality.	Methods.
Unknown, 10th cent.	Religious	St. Peter's, Grotte Nuove	Mosaic.
Do. 8th do.	Do.	Do., do.	Do.
Giotto, after	Do.	Do., do.	Do.
Andrea da Pisa	Portraits, &c.	Do., do.	Do.
A. Sacchi, &c., after	Legendary	Do., S. Longinos	Do.
Unknown, 1122	Religious	Do., Chapel of the Confession	...
L. Sabbatini	Do.	Do., Sagrestia Commune	Do.
Giulio Romano Il Fattore	Do.	Do., do. dei Canonici	Do.
Giotto	Do.	Do., Chapter House	Oil.
Melozzo da Forli	Do.	Do., do.	Fresco.
Muziani	Do.	D., Sagrestia dei Beneficiali	...
Guido, after	Legendary	Lateran	Mosaic.
Jacopo da Turrita Gaddo Gaddi Jacopo di Camerino	Religious	Do., the Vault	Do.
Cav. d'Arpino Roncalli	Do.	Lateran, Transept.	Fresco.
Cav. d'Arpino B. Croce Scipione Gaetano	Various	Do., Chapel Massimo	...
Marcello Venusti	Religious	Do., Sacristy	...
Giotto	Do.	Do., Aisle	Fresco.
Procaccini S. Conca B. Cæsari C. Nebbia Nogari Ricci di Novara	Legendary	Do., Transepts	Do.
Andrea Sacchi Giacinto Gemignani Carlo Maratta Andrea Camassei	Religious	S. Giovane in Fonte	Do.
Unknown, 5th cent.	Arabesques, &c.	Do., Chapel St. John	Mosaic.
Do.	Do.	Oratory St. Venantius	Do.
Do., 7th cent.	Legendary	Do. do.	Do.
Do.	Religious	Scala Santa Tribune	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Philippus Rusutus . .	Legendary . .	Sta. Maria Maggiore, Basilica	Mosaic.
Unknown, 8th cent. .	Religious . . .	Do., (side walls)	Do.
Jacobus da Turita . .	Do.	Do., (Vault of Tribune) .	Do.
Pozzo			
Cesare	Do.	Sistine Chapel . .	Fresco.
Nebbia, &c. . . .			
Guido			
Lanfranco	Do.	Do., Capella Paolina	Do.
Cav. d'Arpino . .			
Cigoli			
B. Croce	Do.	Do., (two smaller chapels).	Do.
Baglioni			
Gir. da Sermoneta . .	Do.	Do., Sforza Chapel . . .	Oil.
Passignani.	Do.	Do., (Sacristy) .	Fresco.
Sc. Gaetani	Do.	Do., do. . .	Oil.
Unknown, 13th cent. .	Do.	San Paolo . . .	Mosaic.
Do., 13th or 14th cent.	Do.	Do., (Passage to Cloisters) .	Fresco.
Do., 13th cent. . .	Do.	Do., (Vault of Tribune) .	Mosaic.
Camuccini.	Do.	Do., (Lunette) .	...
Podesti.			
Gagliardi			
Balbi			
Coghetti			
De Sanctis. . . .	Do.	Do.	Fresco.
Consoni			
Marianecci. . . .			
Marioni.			
Carta			
Unknown	Legendary . .	San Lorenzo, (Basilica) .	Mosaic.
Ciro Ferri			
Corbellini	Religious . . .	S. Agnese, (Piazza Navona)	Fresco.
Baciccio			
Unknown, 7th cent. .	Legendary . .	S. Agnese fuori le Mura .	Mosaic.
Raphael	Religious . . .	S. Agostino . .	Fresco.
Baciccio			
Carlo Maratta . .			
Odazzi	Legendary . .	S. Andrea al Quirinale	...
Mazzanti			
Borgognone . . .			

Painters' Names.	Kind of Subject.	Locality.	Methods.
Lanfranco	Religious . . .	S. Andrea delle Valle.	Fresco.
Domenichino . . .			
Il Calabrese . . .			
Gavin Hamilton . .	Do.	Do. dei Scozzesi	Do.
Jamieson			
Giov. della Marca .	Legendary . .	S. Antonio Abate .	Do.
Pomarancio . . .			
Domenico Muratori .	Legendary, &c. .	SS. Apostoli . .	...
Baciccio			
Benedetto Suti . .			
Angostino Ciampelli	Do.	S. Bibiana . . .	Fresco.
Pietro da Cortona .			
Guido	Religious . . .	The Cappuccini .	Oil.
Gherardo della Notte			
Pietro da Cortona .			
Domenichino . . .			
Andrea Camassei .			
Domenichino	Do.	Do.	Fresco.
Do.	Allegorical . .	S. Carlo a Catinari	Do.
Guido	Legendary, &c. .	Do. do. . .	Do.
Pietro da Cortona .			
Lanfranco			
Andrea Sacchi . .			
Carlo Maratta . .	Do.	Do. in the Corso	...
Francesco Mola . .			
Do., after	Religious . . .	Do. do. . . .	Mosaic.
Unknown, 9th cent. .	Legendary . .	S. Cecilia . . .	Do.
Seb. Conca	.....	Do.	Fresco.
Guido	Legendary . .	Do.	...
Cav. d'Arpino, after .	.....	San Cesareo . .	Mosaic.
Ancient.	.....	San Clemente (Excavations)	...
Unknown, 13th cent. .	.....	Do.	Mosaic.
Giovenale da Orvieto	Religious, &c. .	Do.	Fresco.
Massaccio			
Unknown, Early . .	Do.	Do., (Lower Church) .	Do.
Do., 6th cent. . . .	Do.	SS. Cosma e Damiano .	Mosaic.
Pinturicchio	Legendary . .	S. Cosimato . .	Fresco.
Unknown, Early . .	Arabesques . .	S. Constanza . .	Mosaic.
Guercino, after . .	Religious . . .	S. Crisogono . .	...
Cav. d'Arpino . .			
Unknown, attributed to Pinturicchio .	Legendary . .	Santa Croce, (Basilica) .	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Baldassare Peruzzi . .	Religious . . .	Santa Croce, (Basilica) .	Mosaic.
Canuti	Legendary . .	SS. Domenico and Sisto	Fresco.
Lanfranco			
Allegrani			
Romanelli			
Unknown, 9th cent. .	Religious . . .	S. Francesco Romano .	Mosaic.
Baciccio	Do.	S. Francesco a Ripa . . .	...
Do.	Do.	St. Gesù, (Cupola, Tribune, Roof) . .	Fresco.
Capalti	Religious, &c. .	Do., Altars . .	Oil.
Carlo Maratta . .			
Giotto	Do.	S. Giorgio in Velabro .	Do.
Santi di Tito . . .	Do.	S. Giovanni dei Fiorentini	Oil.
Cigoli			Fresco.
Passignani. . . .			
Salvator Rosa . .			
Baccio Carpi . . .			
Lanfranco			
Pomarancio . . .			
Tempesta			
Pomarancio . . .	Do.	SS. Giovanni e Paolo . .	...
Marco Benefial . .			
Carlo Maratta . . .	Do.	S. Guiseppe de' Falegnami .	Oil.
A. Sacchi	Do.	S. Gregorio . . .	Do.
Luca Signorelli . .			
Guido and Domenchino	Do. and Legendary .	Do.	Fresco.
Andrea Sacchi . .	Do.	St. Isidoro . . .	Oil.
Carlo Maratta . .			Fresco
Seb. Conca . . .	Do.	S. Lorenzo e Damaso . .	...
F. Zucchero . . .			
Guido	Do.	Do. in Lucina .	...
Marco Benefial . .			
Pietro da Cortona . .	Legendary . .	Do. in Miranda .	Oil.
Biccherai	.....	Do. in Panis-Perna . .	Do.
Domenichino	Legendary . .	S. Luigi de' Francesi .	Fresco.
Guido	Do.	Do.	..

Painters' Names.	Kind of Subject.	Locality.	Methods
Bassano	Legendary . .	S. Luigi de Francesci.	...
M. Angelo da Caravaggio			
Cav. d'Arpino . . .	Do.	Do.	Fresco.
Pierino del Vaga .	Do.	S. Marcello . . .	Do.
D. da Volterra . .			
Frederigo Zucchero .	Religious . . .	Do., (Chapel) .	Oil.
Taddeo do. . . .	Do.	Do., do. . . .	Fresco.
Palma Giovane, &c. .	Do.	S. Marco . . .	...
Unknown	Do.	Do.	Mosaic
Borgonone	Do.	Do.	Fresco.
Domenichino . . .	Do.	S. Maria degli Angeli	Oil.
Carlo Maratta . .			
Romanelli			
Roncalli			
Mancini			
Musciano			
Bianchini			
Constanzi			
P. Battoni			
Subleyras			
Odazzi	Do.	Do. do. . . .	...
Trevisani			
Sicciolante . . .	Do.	Sta. Maria delle Anima . .	Fresco.
Francesco Salviati .			
Pinturicchio	Legendary . .	Sta. Maria di Ara Cœli .	Do.
Fran. da Citta di Castello	Do.	Do. do., (roof) .	Do.
Luca Signorelli . .			
Benefial	Do., &c. . .	Do., do., (Chapels)	...
Girolamo Sicciolante			
Niccolò da Pesaro . .	Do.	Do., do., (do. Antony) .	Fresco.
Rossetti	Do.	S. Maria di Loreto	Mosaic
Musciano	Do., &c. . .	Do. Sopra Minerva	Fresco.
Cesare Nebbia . .			
Filippino Lippi . .			
Raffaelino del Garbo			
Giovanni de' Vecchi			
Marcello Venusti .			
Carlo Maratta . .	Do.	Do. di Monte Santo dei Miracoli . .	...
Gimignani			
Giulio Romana . .	.....	Della Navicella .	Fresco.
Pierino del Vaga .			

Painters' Names.	Kind of Subject.	Locality.	Methods.
Unknown, 9th cent.	Religious	S. Maria della Navicella.	Mosaic.
Taddeo and Pietro Zucchero	Do. and Legendary	Do. dell' Orto	Fresco.
Nic. da Pesaro, Baglioni and The Zuccheros	Do.	Do. do.	Do.
Raphael	Sibyls	Do. della Pace	Do.
Rosso Florentino, Carlo Maratta, Baldassare Peruzzi, Francesco Vanni, Morandi	Religious	Do. do.	Do.
Albano, Passignani, Lavinia Fontana	Do.	Do. do.	Do.
C. Casi, Sicciolante, Baldassare Peruzzi	Do.	Do. do., (Chapel)	Do.
Pinturicchio	Legendary	Do. del Popolo	Do.
Carlo Maratta, Daniele, Morandi	Do.	Do. do., (Cibo Chapel)	Oil.
Pinturicchio	Do.	Do. do., (Chapel Virgin)	Fresco.
Do.	Do.	Do. do., (Vault, Choir, &c. &c.)	Do.
Annibale Caracci, M. Angelo da Caravaggio	Religious	Do. do., (Chapel)	Oil.
Giovanni da S. Giovanni	Do.	Do. do., (Falconieri do.)	Fresco.
Lodovico di Pace, after Raphael	Do.	Do. do., (Vault Cupola)	Mosaic.
Sebastiano del Piombo, finished by Salviati	Do.	Do., do., Altar	Oil.
Vanni	Do.	Do., do., Lunettes	Fresco.
Pietro Cavallini	Do.	S. Maria in Trastevere	Mosaic.
Ciampelli	Do.	Do. do.	Fresco.
Palma Vecchio, Il Bolognese	Do.	Do. dei Crociferi	Oil.
Pietro da Cortona	Do.	Do. in Vallicella	Fresco.
Scipione Gaetano, M. A. Caravaggio	Do.	Do. do.	Oil.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Cav. d'Arpino Carlo Maratta Rubens Baroccio	Religious	S. Maria in Vallicella	Oil.
Guido, after	Do.	Do. do.	Mosaic.
Pietra da Cortona	Do.	Do. do., roof, Sacristy, ceiling, Chapel.	Fresco.
Romanelli Vanni	Do.	Do.do.,(Oratory)	Do.
Domenichino Guercino Guido	Do.	Do. della Vittoria	...
Sebastiano Conca	Do.	S. Martina	Oil.
Gaspar and Nicholas Poussin	Landscape, &c.	St. Martino di Monte	Fresco.
Unknown, 8th and 9th cent.	Religious	SS. Nereo ed Achilleo.	Mosaic.
Roncalli	Do.	Do. do.	Fresco.
Domenichino Baldassare Peruzzi Pinturicchio	Do.	S. Onofrio	Do.
Leonardo da Vinci	Do.	Do., (Convent)	Do.
Raphael, after	Do.	S. Paolo alle tre Fontane.	Do.
Francesco Zucca	Legendary	Do. do.	Mosaic.
Sebastiano del Piombo after designs by M. Angelo	Religious	St. Pietro in Montorio, Borgherini Chapel	Oil. Fresco.*
Vasari	Do.	Do., (Chapel of St. Paul)	...
Salviati D. da Volterra	Do.	Do., (do. of St. John)	...
Stellaert, attributed to Van Dyck	Do.	Do., (next Chapel)	Oil.
Giovanni de' Vecchi	Do.	Do.	Fresco.
Guercino	Do.	S. Pietro in Vincoli	Oil.
Jacopo Coppi	Do.	Do., (Tribune)	Fresco.
Unknown, 7th cent.	Do.	Do.	Mosaic.
Pollajuolo's pupils	Allegorical	Do.	Fresco.
Domenichino	Religious	Do., (Inner Sacristy)	Oil.
Unknown, 9th cent.	Legendary, &c.	S. Prassede	Mosaic.

* The paintings in oil on stone blackened, those in fresco well preserved.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Unknown, 9th cent.	Legendary, &c.	S. Prassede Orto del Paradiso	Mosaic.
Fred. Zucchero	Religious	Do., Chapel	Oil.
Cav. d'Arpino			
Giulio Romano			Fresco.
Unknown, 9th cent.	Do.	S. Pudentiana	Mosaic.
Pomarancio	Do.	Do., (Cupola)	Fresco.
Giov. di S. Giovanni	Legendary	Santi Quattero Incoronati	Do.
Unknown, 13th cent.	Religious	Do. do., (Chapel, St. Silvester)	Do.
Do., 5th cent.	.....	S. Sabina	Mosaic.
Sassoferrato	Religious	Do., (Chapels)	Oil.
L. Fontana			
The Zuccheri	Legendary	Do., do.	Fresco.
Odazzi	.....	Do., (Cupola)	Do.
Unknown, Ancient	.....	Do., (Vicinity)	...
Domenichino	Religious	S. Silvestro al Quirinale	Fresco.
Scipione Gaetani	Do.	Do. do.	Oil.
Ricci da Messina			
Cav. d'Arpino			Fresco.
Polidoro da Caravaggio			
Maturino			
Pomarancio	Legendary	S. Stefano Rotondo	Do.
Unknown, 7th cent.	Do.	Do. do.	Mosaic.
B. Croce	Do.	Sta. Susanna	Fresco.
Lauretti	.....	Do.	...
C. Nebbia			
Unknown, 8th cent.	Religious	S. Teodoro	Mosaic.
Dan. da Volterra	Do.	La Trinita de Monti	Fresco.
Sodona			
Perugino			
Fred. Zucchero			
Pierino del Vaga			
Salviati			
Veit, and pupils of Overbeck	Do.	Do. do.	Do.
Guido	Do.	Do. de Pellegrini	...
Cav. d'Arpino			
Borgonone			
Tad. & Fred. Zucchero	Historical	Do. Scala Regia	Fresco.
Vasari			
Guiseppe Porta			

Painters' Names.	Kind of Subject.	Locality.	Methods.
Lucca Signorelli. .			
Sandro Botticelli .			
Cosimo Rosselli . .	Religious . . .	La Trinita Capella Sistina	Fresco.
Perugino			
Dom. Ghirlandajo .			
Franco Salviati . .			
Michelangelo Buonarroti	Do.	Vatican, (Capella Sistina)	Do.
Do.	Do.	Do.,(do. Paolina)	Do.
Daniele da Volterra .	Arabesques . .	Do.,(Museo Pio Clementino)	Do.
Raphael	Religious . . .	Do., (the Arazzi)	T'pestry
Podesti	Legendary . .	Do.,(Great Hall)	Fresco.
Raphael & his Scholars	Historical . .	Do., (the Stanze)	Do.
Perugino			
Sodona			
Pierino del Vaga .			
Giovanni da Udine .			
Polidoro da Caravaggio	Do.	Do., do. . . .	Do.
Giulio Romano . .			
Francesco Penni .			
Raffaele del Colle .			
Raphael			
G. da Udine . . .	.....	Do. Sala degli Chiaroscuri	Do.
The Zuccheri . . .			
Fra Angelico	Legendary . .	Do., (Capella di San Lorenzo)	Do.
Raphael	Religious . . .	Do., (Loggie) .	Do.
Giulio Romano . .			
Pierino del Vaga .			
Pelegrino da Modena	Do.	Do., do. . . .	Do.
Francesco Penni . .			
Raffaele del Colle .			
Sicciolante da Sermoneta	Do.	Do., (the other wings)	Do.
Tempesta			
Lorenzo Sabbatini, &c.			
Giovanni da Udine . .	Arabesques . .	Do., (Loggie) .	Do.
The Great Masters . .	Religious . . .	Do., (Pinacotheca)	Oil.
Scipione Cajetani .			
Paris Nogari . . .	.....	Do., (Library, Great Hall)	Fresco.
Cesare Nebbia . .			
Pierino del Vaga .	Arabesques and	Do., (Gabinetto	Do.
Pinturicchio . . .	Historical . .	Borgia)	

Painters' Names.	Kind of Subject.	Locality.	Methods.
Giovanni da Udine .	Arabesques and Historical . .	Vatican (Gabinetto Borgia)	Fresco.
Baroccio	.....	Casino del Papa .	Do.
Fred. Zucchero . .			
Santo di Tito . . .			
Cav. d'Arpino . .	Historical . .	The Conservatore	Do.
Laureti			
Daniele da Volterra.			
Pinturicchio . . .	Religious . . .	Do., (Chapel) .	Do.
M. A. Caravaggio .			
Caracci			
Romanelli			
Avanzino Nucci . .			
The Zuccheri . . .	.....	Lateran Mus. (Christian) .	Do.
Melozzo da Forli . .	Religious . . .	Quirinal Palace .	Do.
Overbeck	Do.	Do., (ceiling sitting-room) .	Do.
Vasari	Historical . .	Palazzo dell' Cancelleria .	Do.
Salviati, &c. . . .			
Tempesta	.....	Do. Colonna . .	Do.
Pomarancio . . .			
Gaspar Poussin . .			
Perugino			
Domenichino . . .	Classical . . .	Do. Costaguti .	Do.
Guercino			
Albano			
Guercino			
Cav. d'Arpino . .			
Lanfranco			
Romanelli			
An. Caracci & Scholars	Do.	Do. Farnese . .	Do.
Raphael	Do.	The Farnesina . .	Do.
Giulio Romano . .			
Francesco Penni . .			
Giovanni da Udine .			
Raffaele del Colle, &c.			
Pomarancio	.....	Palazzo Mattei .	Do.
Lanfranco			
Domenichino . . .			
Pietro da Cortona .	Classical . . .	Do. Pamfili . .	Do.
Romanelli			
G. Poussin . . .			
Guido	Do.	Do. Rospigliosi	Do.
Tempesta	Do.	Do. do. . . .	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Paul Brill	.....	Palazzo Rospigliosi . . .	Fresco.
Camuccini	.....	Do. Torlonia. .	...
Pelagi			
Landi			
Overbeck	Religious . . .	House of the Zuccheri	Fresco.
Ph. Veit			
W. Schadow . . .			
P. Cornelius . . .			
Mengs	Classical . . .	Villa Albani . .	Do.
Guercino	Do.	Do. Ludovisi .	Do.
Domenichino . . .			
T. Zucchero . . .			
Giulio Romano . . .	.....	Villa Lante (removed to the Borghesi) .	Do.
Giulio Romano . .	.....	Do. Madama .	Do.
Giov. da Udine . .			
Koch	Poetic . . .	Do. Massimo .	Do.
Ph. Veit			
Schnorr			
Overbeck			
Fürich			
Tivoli.			
Cav. d'Arpino . . .	Religious . . .	Villa Aldobrandini	Fresco.
Carlo Maratta . . .	.....	Do. (Falconiere)	Do.
Grotto Ferrata.			
Unknown	Religious . . .	S.Basilio(Convent)	Mosaic.
Domenichino	Legendary . .	Do., do. . . .	Fresco.
Poli.			
Giulio Romano . . .	.....	Villa Catana . .	Fresco.
Unknown	Religious . . .	Sta. Maria . . .	Do.
Velletri.			
Perugino, School of. .	Religious . . .	Cathedral (perishing) . .	Fresco.
Giov. Balducci . . .	Legendary . .	Do.	Oil.
Monte Casino.			
Marco da Siena . .	.....	Monastery(Subterranean Chapel, decaying)	Fresco.
Mazzaropi			

Painters' Names.	Kind of Subject.	Locality.	Methods.
Unknown	.....	Monast., (Chapels)	Mosaic.
Luca Giordano . . .	Historical . .	Do. do. . . .	Fresco.
Bassano	Religious . . .	Do. (Refectory).	...
NAPLES.			
Vicenzo da Forli .			
F. Imparato . . .			
Santafede	Sacred and Legendary	Duomo	Fresco.
Luca Giordano . .			
Solimena			
Tommaso degli Stefani	Religious . . .	Do., (Minutole Chapel) . .	Do.
Luca Giordano . .	Legendary . .	Santa Restituta .	Do.
Silvestro Buono . .			
Unknown, Ancient . .	Religious . . .	Do., (Chapel Sta. Maria).	Mosaic.
Do. do. . .	Do.	Do., do. S. Giovanni . .	Fresco.
Domenichino	Legendary . .	Do., do. San Gennaro .	Do.
Spagnoletto	Do.	Do., do. . . .	...
Stanzioni	Do.	Do., do. (Sacristy)	...
Luca Giordano . .			
Caracciolo	.....	S. Agnello Maggiore . . .	Oil.
Santafede	Religious . . .	S. Agostino degli Scalzi	Do.
Marco Calabrese. .			
Giocomo del Po . .			
Luca Giordano . .			
Colantonio del Fiore .	Legendary . .	S. Angelo a Nilo, (exterior)	Fresco.
Marco da Siena . .	Do.	Do. do. . . .	...
Tommaso degli Stefani			
Colontanio del Fiore (1371)	Do.	S. Antonio Abate .	...
Lanfranco	Religious . . .	SS. Apostoli . .	Fresco.
Benasca Solimena .			
Luca Giordano . .			
Gio. Battista Calandra, after Guido . .	Do.	Do.	Mosaic.
Pietro da Cortona .			
Valentino			
L. Giordano	Do.	L'Ascensione . .	...
Do.	Do.	S. Brigida . . .	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Gennaro Maldarelli . .	Religious . . .	S. Carlo ali' Arena, (Cupola)	Fresco.
Micheli di Napoli .	Historical . .	Do. do. . . .	...
Guiseppe Mancinelli			
Francesco Curia . .	Sacred and Legendary . .	S. Caterina a Formello	...
Silvestro Buono . .			
Marco da Siena . .			
Giotto	Destroyed . .	Santo Chiara . .	Fresco.
Francesco Simone .	Various . . .	Do.	Do.
Seb. Conca . . .			
Francesco di Mura .			
Bonito			
Lanfranco	Religious . . .	Do., Sanfelice (Chapel) .	...
Giotto (?)	Legendary . .	Do., (Refectory)	Fresco
Do.	Religious . . .	House No. 23, near gate leading to do. .	Do.
Andrea da Salerno . .	Legendary . .	S. Domenico Maggiore .	...
Agnola Franco . . .	Religious . . .	Do., (3rd Chapel)	Fresco.
Andrea da Salerno . .	Do.	Do., (4th do.) .	...
Tommaso degli Stefani	Do. . . .	Do., (7th do.) .	...
Gian. Vicenza Corso			
Albert Durer (?) .			
Maestro Simone . .	Do.	Do., (Chapels) .	...
Luca Giordano . .			
Solimena	Do.	Do., (Sacristy) .	Fresco.
Benasca	Do.	S. Filippo Neri .	Do.
Luca Giordano . .			
Siciliano			
Corenzio			
Solimena	Do.	Do., (Cupolas and chapels)	Do.
Simonelli			
Cesare Fracanzano .	Do.	Do. (Chapels) .	Oil. Fresco.
Roncalli			
Santafede			
Guido			
L. Giordano . . .			
Corenzio			
Gessi			
Pietro da Cortona .			
Spagnoletto . . .			
Marco da Siena . .			
Domenichino . . .			
Tintoretto			

Painters' Names.	Kind of Subject.	Locality.	Methods.
Bassano Andrea di Salerno Mignard Palma Vecchio Cav. d'Arpino	Religious	S. Filippo, (Chapel)	Oil. Fresco.
Camuccini	Legendary	S. Francesco di Paola	Oil.
Solimena Marco da Siena	Religious	Gesù Vecchio	...
Solimena Stanzioni Spagnoletto Corenzio L. Giordano	Do.	Do. Nuovo	Fresco.
Imparato	Do.	Do. do.	Oil.
Bernardo Lama Bernardino Siciliano Marco da Siena Angelo Criscuolo Andrea del Sarto	Do.	G. Giacomo degli Spagnuoli	Do.
Andrea del Salerno	Legendary	S. Giorgio dei Genovesi	...
Leonardo da Bisuccio	Do.	S. Giovanni a Carbonara	Fresco.
Vasari Doceno	Religious	Do.do.,(Sacristy)	Do.
Molinari	Legendary	S. Guiseppe a Chiaja	Oil.
L. Giordano Bernardo Lama Pacecco de Rosa Spagnoletto	Religious	S. Gregorio Armeno	Oil. Fresco.
Giotto, school of	Allegorical, &c.	L'Incoronata	Fresco.
Gennaro di Cola	Historical	Do.	Do.
Maestro Simone Antonio Solario Vincenzo Corso	Do., &c.	S. Lorenzo	Oil. Do.
Andrea Vaccaro De Matteis Bernardino Siciliano	Religious	S. Maria degli Angeli	...
Francesco di Mura	.....	Do. dell' Annunziata	...
Corenzio	.....	Do.do.,(Sacristy)	Fresco.
Criscuolo L. Giordano	Religious	Do. Donna Regina	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Micco Spadaro . . .	Religious . . .	S. Maria Donna Romita . .	...
Andrea da Salerno . .	Do.	Do. delle Grazie, &c. . .	...
Santafede	Do.	Do. la Nuova .	Fresco.
Corenzio			
Simone Papa . . .			
Amato il Vecchio .	Do.	Do. do. . . .	...
Marco da Siena . .			
Corenzio	Do.	Do. do., (Chapel of the Crucifix)	Fresco.
L. Giordano . . .	Do. . . .	Do. do., (Chapel)	Oil.
Spagnoletto . . .			
Stanzioni	Legendary . .	Do. do., (vault of do.) . .	Fresco.
Pietro del Donzello .	Religious . . .	Do. do., (Refectory)	Do.
Polito Do. . .			
Lionardo da Pistoja .	Legendary . .	Do. del Parto .	Oil.
Andrea Vaccaro . .	Do.	Do. del Pianto .	Do.
L. Giordano . . .			
Do.	Religious . . .	Do. della Pieta &c., (Cupola)	Fresco.
Anella de Rosa . .	Do.	Do. do. . . .	...
Stanzioni			
Giordano			
Stanzioni	.....	Do. Regina Cœli . . .	Fresco.
L. Giordano . . .			
Giordano	.....	Do. della Sanita	...
Bernardino Siciliano			
Vaccaro, &c. . . .			
Lanfranco	Religious . . .	S. Martino . . .	Fresco.
Stanzioni	Do.	Do.	Oil.
Spagnoletto	Do.	Do.	...
Cav. d'Arpino . . .	Do.	Do.	Fresco.
Guido	Do.	Do.	Oil.
Spagnoletto . . .	Do.	Do., (side walls choir)	Fresco.
Caracciolo			
Carlo Caliari . . .			
Domenico Vaccaro .	Do.	Do., (Chapels) .	Do.
Stanzioni			
Andica Vaccaro . .			
Corenzio			
Carlo Maratta . .	Do.	Do., do. . . .	Do.
De Matteis . . .			
Stanzioni			
Annibale Caracci .	Do.	Do., do. . . .	Do.
Solimena			
Finoglia			

Painters' Names.	Kind of Subject.	Locality.	Method.
Vaccaro Micco Spadaro	Religious and Landscape	S. Martino (Chapels)	Fresco.
Pachecco di Rosa La Mura Stanzioni Caracciolo	Do.	Do. do.	Do.
Corenzio De Matteis	Do.	Do. do.	Do.
Cav. d'Arpino Stanzioni Michelangelo da Caravaggio	Do.	Do. (Sacristy)	Do.
Spagnoletto L. Giordano	Do.	Do. (the Tesoro)	Do.
Corenzio Finaglia Stanzioni Luca Cambiaso	Do.	Do. (Chapter House)	Do.
Avanzino	Legendary	Do. (del Colloquio)	Do.
Caravaggio Santafede Corenzio Giordano	Religious	Monte della Misericordia	...
Silvestro dei Buoni	Do.	Monte Oliveto	..
Santafede	Legendary	Do. (d'Avalos Chapel)	...
Simone Papa	Historical	Do. (the Choir)	Fresco.
Corenzio Stanzioni	Religious	S. Paolo Maggiore	Do.
Marco di Siena	Do.	Do. (passage to Sacristy)	...
Solimena	Do.	Do. (Sacristy)	Fresco.
Protasio Crivello, 1180	Do.	S. Pietro ad Aram do.	Oil.
Cav. Calabrese	Legendary	Do. a Maiella	Fresco.
De Matteis	.....	Do. do. (Chapel)	Do.
Stanzioni	Religious	Do. do. do.	...
Francesco Imperata	Legendary	Do. Martire	...
Corenzio	.....	Do. e Paolo	Fresco.
Scheffer Corenzio Marco da Siena	Religious	SS. Severino e Sosio	Do.
Criscuolo Corenzio	Do.	Do. do.	Do.
Lo Zingaro	Various	Do. do.	Oil.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Andrea da Salerno .			
Perugino	Various . . .	SS. Severino e Sosio	Oil.
G. Imparato . . .			
G. d'Amato . . .			
Lo Zingaro	Legendary . .	Do. do. . . .	Fresco.
Santafede			
De Matteis . . .	Sacred and Legendary	S. Teresa . . .	Do.
Giacomo del Po . .			
L. Giordano . . .	Religious . . .	Do.	...
Stanzioni			
L. Giordano	Legendary . .	Do. (Largo S. Taresella a Chiaia) . .	...
Polidoro da Caravaggio	.....	Palazzo Bisignano	Fresco.
Francesco di Mura . .	Historical . .	Do. Maddaloni .	...
Corenzio	.....	Do. Sansevero .	Fresco.

GERMANY.

Painters' Names.	Kind of Subject.	Locality.	Methods.
MUNICH.			
Heinrich Hess, assisted by Shraudolph and other scholars	Religious and Legendary	Allehcilige Kapelle, and St. Bonifacii (Basilica) . . .	Fresco.
Direktor von Cornelius, assisted by Herrmann and other scholars	Religious and Classical	Ludvigskirche and Glyptothek	Do.
Herr von Kaulbach . .	Various . . .	New Pinakothek (Exterior) .	Do.
Kaulbach			
Foerster			
Zimmermann . . .			
Röchel			
Stürmer			
Herrmann			
Stilhe	Historical . .	Hofgarten (some decaying)	Do.
Hiltensperger . . .			
Lindenschmidt . .			
Schilgen			
Gassen			
Eberle			
Monten			
Neher	Do.	Isar-Thor (exterior, decaying)	Do.
Kogel			
Von Schnorr and Scholars	Do.	The Residenz . .	Encaustic. Do.
BERLIN.			
Schinkel, aft. designs by	Classical . . .	Portico Museum .	Fresco.
Herr von Kaulbach . .	Historical . .	New Museum . .	Water-glass.
DUSSELDORF.			
Veit	Historical . .	Museum	Fresco.
COLOGNE.			
Steinle	Religious . . .	Cathedral . . .	Fresco.

Painters' Names.	Kind of Subject.	Locality.	Methods.
APPOLINARISBERG.			
Deeger	Religious . . .	St. Appolinaris .	Fresco.
Ittenbach			
Müller, &c., &c. . .			
AIX-LA-CHAPELLE.			
Rethel	Historical . .	Rathaus	Do.

FRANCE.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Mignard	Religious	Val de Grace	Fresco.
Gros	Historical	Pantheon	Oil.
Gerard	Historical	Pantheon	Fresco.
Paul Delaroche	Do.	Ecole des Beaux Arts (Hemicycle)	Oil.
Hypolite Flandrin	Religious	St. Germain des Prés	Fresco.
Flandrin	Do.	St. Vincent de Paul	Do.
Picot	Do.	St. Vincent de Paul	Do.
Ziegler	Do.	Madeleine	Wax.
Abel de Pujol	Do.	Madeleine	Wax.
Schnetz	Do.	Madeleine	Wax.
Signol	Do.	Madeleine	Wax.
Delaroche	Do.	Madeleine	Wax.
Couderc	Do.	Madeleine	Wax.
Flandrin	Do.	St. Séverin (Chapel St. John)	Fresco.
Orsel	Do.	Notre Dame de Lorette	Do.
Perrin	Do.	Notre Dame de Lorette	Do.
Royer	Do.	Notre Dame de Lorette	Do.
Lusson	Ornamental	Sainte Chapelle	Temper.
Violet le Duc.	Ornamental	Sainte Chapelle	Temper.
Abel de Pujol	Religious	St. Paul, St. Louis	Fresco.
Decaisne	Religious	St. Paul, St. Louis	Fresco.
Valbrun	Religious	St. Paul, St. Louis	Fresco.
Pierre	Do.	Saint-Roch (Cupola)	...
Abel de Pujol	Do.	Saint-Sulpice	Fresco.
Guillemot	Do.	Saint-Sulpice	Fresco.
Vinchon	Do.	Saint-Sulpice	Fresco.
Henri and E. Delacroix	Do.	Saint-Sulpice	Fresco.
.....	Do.	Saint-Ambroise	Do.
Eugène Delacroix	Do.	Saint-Denis du Marais	...
Alaux	Do.	Sainte-Elizabeth	...
Blondel	Do.	Sainte-Elizabeth	...
Lesueur	Allegorical	Saint-Jacques du Haut-Pas	...

Painters' Names.	Kind of Subject.	Locality.	Methods.
Guérin Ary Scheffer	Historical	Saint - Jean, Saint-François	...
Greuze Frézel	Religious	Saint-Laurent	...
Phillipe de Champagne Delaval Picot Decaisne Degeorges Monvoisin	Do.	Saint-Leu	Oil.
Gostier A. Signol	Do.	Saint-Louis d'Antin	...
Vauttier Mignard Ant. Coypel Perron Perrin Simon Vouet Lemoine Hallé	Do.	Do. en l'Ile	Oil.
Brunetti Wafflard Lesueur Galoche Restoul	Do.	Sainte-Marguerite	Do.
Bon Boullonge Restoul Couderc	Do.	L'église des Missions étrangères	Do.
Seb. Bourdon Simon Vouet Delestre Caminade	Do.	Saint-Nicholas des Champs	Do.
Valentin Daurin Lebrun Coypel Lesueur Mignard	Do.	Do. do. du Chardonnet	Do.
C. Lebrun	Do.	Notre-Dame de l'Abbaye-aux-bois	Do.
G. Audron	Do.	Do. do. des Blanco-Manteaux	...
Vanloo Gaillot	Do.	Do. do. des Victoires	Oil.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Degeorges	Do.	Saint-Philippe du Roule .	...
Lemoine	Religious . . .	Saint-Thomas d' Aquin	Oil.
Guillemot			
Ary Scheffer . . .			
FONTAINEBLEAU.			
Primaticcio, restored by Abel du Pujol .	Mythological .	Palace	Fresco.
LYONS.			
Hypolite Flandrin . .	Historical . .	Abbaye St. Ainay	Fresco.
Anonymous	Ornamental . .	Notre Dame de Bon Secours	Temper.

ENGLAND.

Painters' Names.	Kind of Subject.	Locality.	Methods.
Sir Peter Paul Rubens	Allegorical . .	Chapel Royal Whitehall .	Oil.
Sir J. Thornhill . . .	Religious . .	St. Paul's (Dome)	Do.
	Allegorical . .	Greenwich Hospital	
Verrio	Do.	Hampton Court .	Do.
Stothard, R.A. . . .	Do.	Burleigh	Do.
Barker	.....	Bath	Fresco.
Sir Edwin Landseer, and other Royal Academicians . .	Poetical . . .	Summer house, Buckingham Palace . .	Do.
C. W. Cope, R.A. . .	Historical . .	Houses of Parliament . .	Do.
W. Dyce, R.A. . . .	Do.	Do. (retouched)	Do.
J. R. Herbert, R.A. .	Do.	Do.	Do.
D. Maclise, R.A. . .	Do.	Do.	Do.
E. M. Ward, R.A. . .	Do.	Do.	Do.
G. F. Watts, R.A. . .	Poetical . . .	Do.	Do.
E. Armitage, A.R.A. .	Do.	Do.	Do.
J. C. Horsley, A.R.A. .	Do.	Do.	Do.
J. Tenniel	Do.	Do.	Do.
D. Maclise, R.A. . .	Historical . .	(Death of Nelson, and The Meeting at Waterloo) .	Water-glass.
E. Armitage, A.R.A. .	Religious . .	Catholic Chapel, Islington .	Fresco.
	Historical . .	University Hall, Gordon Sq.	Do.
W. Dyce, R.A. . . .	Do.	All Saints, Margaret Street (retouched)	Do.
Stephens, after . . .	Do.	St. Paul's (Spandril) . . .	Mosaic.
G. F. Watts, R.A., after	Do.	Do. do. . . .	Do.
F. Leighton, R.A., after Poynter, A.R.A., after R. Redgrave, R.A., after, &c. . . .	Portraits of the famous Painters, Sculptors, &c.	South Kensington (Arcades)	Mosaic.

Painters' Names.	Kind of Subject.	Locality.	Methods.
	Historical . .	Lincoln's Inn Hall	Fresco.
	Mythological, &c.	No. 7, Carlton House Terrace	Do.
	Religious . .	St. James the Less, Vauxhall Road .	Do.
G. F. Watts, R.A. . .	Poetical . . .	Marquis of Lansdowne's, Bowwood . . .	Do.
	Do. . . .	Do. do. . . .	Oil.
	.....	Staircase, Holland House	Do.
	Allegorical . .	Dining-Room, Little Holland House . .	Do.
	Historical . .	Wallington Hall, Northumberland .	Do.
W. B. Scott	Poetical . . .	Do. do. . .	Turpentine.
	Do. . . .	Penkill Castle, Ayrshire .	Wax.
Gambier Parry . . L'Estrange . . .	Religious . . .	Ely Cathedral . .	Distemper.
Gambier Parry . . .	Do.	Highnam Ch., near Glo'ster	Qy.
	Poetical . .	Shipley (ceiling) .	Oil.
	Do. . . .	Croxteth (do.) . .	Do.
	Do. . . .	Kensington . . .	Fresco.
	Procession . .	Coombe Abbey .	Water-glass.
Albert Moore	Religious . .	St. Alban's Church (Rochdale) . . .	Do.
	Poetical. . .	Claremont (Manchester)	Fresco.
	Do. . . .	Queen's Theatre, London .	Distemper.
	Poetical. . .	Gaiety Theatre .	Oil and Turpentine.
H. S. Marks	Do. . . .	Prince's do. (Manchester)	Do.
	Historical . .	Competition Gallery (S. K. Museum) .	Do.

Painters' Names.	Kind of Subject.	Locality.	Methods.
F. Leighton, R.A. . .	Religious . . .	Lyndhurst Ch. (New Forest)	Qy.
Aglio	Religious . . .	Catholic Church (Moorfields)	Fresco.
Salviati, after . . .	Religious . .	Westminster Abbey . .	Mosaic.
Clayton	Do. . . .	Wolsey Chapel .	Do.
	Allegorical .	Albert Memorial .	Do.
W. Cave Thomas . .	Philosophical .	LectureTheatre, University Col.	Oil.
	Religious . .	Chapel of the Russian Embassy, Welbeck Street . .	Oil and Wax.
	Do. . . .	Christ Church, Marylebone .	Do.
	Poetical . . .	Flaxman Hall (contemplated)	...

CONCLUDING REMARKS.

In so extensive a list there may possibly be, here and there, inaccuracies in reference to the methods; it is, however, sufficiently correct to show that Fresco was preferred by the Great Masters for Mural Decoration, though Mosaic, Oil, and Distemper were well understood. This preference for Fresco in the execution of monumental works in the halcyon days of art was, therefore, deliberate, and with the conviction that it was the best adapted to the purpose. If Fresco is susceptible of injury from damp walls, Distemper is much more so; under such conditions the latter soon perishes; and it is stated in the Reports of the Royal Commission on the Fine Arts that many Frescoes have long survived the retouchings which were made in Tempera. Notwithstanding the durability of Mosaic, and the preservation of this art in Italy, it was never a favourite method with the great painters and architects, and when adopted, it was sparingly, and within well defined limits. The Water-Glass process may prove superior to all others, but the preceding table shows that till the invention of this process Fresco had the testimony of the Great Masters and the centuries in its favour.

FINIS.

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